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UNDERSTANDING STUDENT ENGAGEMENT AS A MULTIDIMENSIONAL  
AND DYNAMIC CONCEPT

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<p>Abstract</p> <p>Growing interest in the sphere of student academic engagement can be explained by practical reasons. Engagement in school affects such aspects as academic conduct, achievement, and emotions experienced in school. Antecedents of student engagement may rise from school and classroom environment. Thus, ensuring availability of opportunities for engagement in classroom is likely to result in increased learning.</p> <p>Engagement is an extremely complicated phenomenon embracing students' emotional, cognitive, and behavioral characteristics. Engagement has a lot in common, but is different from such concepts as emotions, interest, and motivation. Theoretical framework of student engagement is also strongly interrelated with the theory of self-regulated learning. Due to a great amount of research studies about students' thinking, behaving and feeling it is difficult to single out specific portions of literature which could be labeled with the term "engagement". However, in spite of problematic issues in the conceptual clarity, the concept of engagement has a potential as a metaconstruct which can provide us with a deeper understanding of students' learning than single constructs would do.</p> <p>Engagement may result from a great variety of antecedents, including individual needs, school-level factors, and classroom context. The theoretical part of this thesis provides a deep review of the educational context factors affecting student engagement discussed in research literature.</p> <p>The empirical part of the study is aimed at exploring classroom environment factors affecting dynamics of student engagement. Research questions are formulated around five specific factors from the classroom environment which are in the center of investigation: the attractiveness of a task for students (related to the use of iPads in tasks), task meaningfulness, autonomy support, interactions with the teacher, and peer regulation. An intervention was carried out with a sample of 11 fourth grade students (4 girls and 7 boys), 10-11 years old, in an authentic English language classroom. The intervention lasted one month, and included six lessons. At each of the lessons video observations were carried out. Video observations are the main source of data in this study, and they are complemented with learning diaries filled out by the students on each of the lessons, and individual products collected after one of the learning activities in order to ensure triangulation across data sources. The process-oriented approach for data analysis is adopted in the study. Student engagement is characterized with the help of on-task/off-task and phase-shift analysis method, and further analyzed in relation to the five specific factors of classroom environment.</p> <p>The results show that the research questions have been answered. The attractiveness of the task was increased with the use of iPads. Use of iPads caused positive emotions in students and situational interest in the task, which initiated task engagement. Meaningful tasks supporting students' autonomy by providing opportunity for choice turned out to be more engaging. Interactions with the teacher observed during the intervention were classified into three main types, each having a different effect on student engagement. Provision of additional instructions turned out to be the most effective type of interactions since it supported original engagement. Regulation of behavior by the teacher in most cases could only restore behavioral engagement. In addition, it was not always successful. Third type of teacher interference, assisting a student, resulted in a student's high dependence on the teacher. Analysis of peer interactions aimed at regulating peers' engagement shows that most types of such interactions were focused around the organization of work mainly from the point of view of turn-taking and using support materials. Attempts to regulate peers' behavior varied in the level of success. In some cases peer regulation was not enough, and a student had to draw the teacher's attention in order for her to help in regulation. A significant part of results goes in line with previous research findings described in the theoretical part of the thesis. The results of the study are also approached from the point of view of theoretical implications, as well as practical implications for teachers aimed at enhancing student engagement.</p> <p>The study is valuable since it provides an insight into the dynamics of student engagement in an authentic learning context. The reasons of individual students' engagement or disengagement are attached to specific contextual factors. Understanding what factors affect student engagement and how these different factors work in a real classroom context can help us design more effective learning environments.</p>			
Keywords    Engagement, interest, motivation, self-regulated learning, classroom environment			

## TABLE OF CONTENTS

<b>1 INTRODUCTION.....</b>	<b>1</b>
<b>2 REVIEW OF PREVIOUS RESEARCH .....</b>	<b>3</b>
2.1 Defining student engagement.....	3
2.1.1 Emotions and interest.....	3
2.1.2 Motivation.....	4
2.1.3 Engagement.....	5
2.1.4 Relations among the concepts.....	8
2.2 Student engagement and self-regulation.....	10
2.3 Factors affecting student engagement.....	13
2.3.1 Individual needs.....	13
2.3.2 School-level factors.....	15
2.3.3 Classroom context.....	17
2.3.4 Concepts and common lines.....	30
2.4 Engagement as a multidimensional concept.....	31
<b>3 AIM AND RESEARCH QUESTIONS.....</b>	<b>33</b>
<b>4 RESEARCH METHODS.....</b>	<b>34</b>
4.1 Measuring student engagement: common practices and challenges.....	34
4.2 Data collection and analysis in this study.....	37
4.2.1 Video observations.....	39
4.2.2 Description of the analyzed learning activities.....	44
4.2.3 Learning diaries.....	44
4.2.4 Group products.....	45
4.2.5 Classroom factors affecting student engagement: Qualitative analysis.....	45
<b>5 RESULTS.....</b>	<b>47</b>
5.1 Assessing quantity and quality of student engagement.....	47
5.1.1 Attractiveness of the task.....	50
5.1.2 Autonomy support in the task.....	52
5.1.3 Meaningfulness of the task.....	54
5.1.4 Students' interactions with the teacher.....	57
5.1.5 Peer support and regulation.....	62
5.2 Engagement as a dynamic concept.....	69
<b>6 CONCLUSIONS AND DISCUSSION.....</b>	<b>70</b>

6.1 Findings of the empirical study in the frame of previous research.....	70
6.1.1 Theoretical implications.....	74
6.1.2 Practical implications.....	76
6.1.3 Implications for future research.....	78
6.2 Evaluation.....	79
6.2.1 Ethical issues.....	79
6.2.2 Validity and reliability.....	80
6.2.3 Limitations.....	83
<b>REFERENCES.....</b>	<b>84</b>
<b>PRINTED TEACHING MATERIALS.....</b>	<b>90</b>

## **FIGURES AND TABLES**

<i>Figure 1.</i> Classification of antecedents of student engagement according to Fredricks, Blumenfeld, and Paris (2004).....	13
<i>Figure 2.</i> Aleksis's popplet.....	55
<i>Figure 3.</i> Individual on-task/off-task time, Group 1, Lesson 1, Part 2.....	58
<i>Figure 4.</i> Individual on-task/off-task time, Group 2, Lesson 2.....	61
<i>Figure 5.</i> Individual on-task/off-task time, Group 3, Lesson 1, Part 1.....	67
<i>Figure 6.</i> Individual on-task/off-task time, Group 3, Lesson 1, Part 2.....	68
<i>Figure 7.</i> A framework of practical guidelines for classroom teaching practices aimed at increased engagement based on the results of the study.....	77
<i>Table 1.</i> Additional study-specific guidelines for on-task/off-task coding.....	42
<i>Table 2.</i> Classroom context factors analyzed in the study.....	46
<i>Table 3.</i> Results of on-task/off-task and phase-shift analysis for Group 1.....	48
<i>Table 4.</i> Results of on-task/off-task and phase-shift analysis for Group 2.....	49
<i>Table 5.</i> Results of on-task/off-task and phase-shift analysis for Group 3.....	50
<i>Table 6.</i> Students' perceptions of contribution of iPads to the entertaining part of the task	51
<i>Table 7.</i> Students' perceptions of contribution of iPads to autonomy support in the task....	53

## 1 INTRODUCTION

The general aim of learning sciences is to understand the cognitive, motivational and social processes in students that result in the most effective learning, and to make use of this knowledge in order to redesign classrooms for deeper learning (Sawyer, 2008). Thus, student engagement has been in the center of attention of many researchers in the field of learning sciences. The very roots of the concept of engagement were driven by desire to improve student learning (Reschly & Christenson, 2012). Learning requires engagement and investment of time and effort from learners. The bigger amount of time learners are engaged, the higher their achievement is (Gettinger & Walter, 2012). Moreover, being actively engaged in learning tasks is a significant condition for meaning-making – a critical element of learning (Resta & Laferrière, 2007). In addition, student engagement at school predicts such outcomes as students' emotions about school and learning, academic performance and conduct (Lam, Wong, Yang, & Liu, 2012). The main practical reason for the growing interest to engagement lies in the fact that antecedents of student engagement may be social or academic, and they may rise from opportunities available at school or classroom for active participation, relationships, and intellectual efforts. Therefore, many of current attempts to improve school climate or curriculum focus on engagement as a key issue to increased learning (Fredricks, Blumenfeld, & Paris, 2004).

Although student engagement has become one of the topical research directions, there is still a lot to be investigated about this phenomenon in terms of both theoretical and practical aspects. The problem of theoretical understanding of the phenomenon lies in the fact that it is strongly interrelated with a variety of concepts and their dimensions (Fredricks et al., 2004), which makes it difficult to draw a distinctive framework of student engagement which would include all the relevant aspects (Ainley, 2012). Student engagement has become a highly significant issue from the practical point of view as well, since students' not perceiving schooling engaging can possibly result in poor conduct, negative emotional state, and lower achievement (see Lam et al., 2012; Perkun & Linnenbrink-Garcia, 2012; Gettinger & Walter, 2012). Student academic engagement is affected by multiple factors. Therefore, the key issue is to approach engagement as a multidimensional concept and try to understand its dynamics in an authentic learning context, that is, **what** initiates, supports, and impedes engagement, and **how** these triggers

work in different combinations. Such understanding is essential for educators in order to realize the complexity of children's experiences at school and design more advanced interventions (Fredricks et al., 2004).

In this study I address both theoretical and practical aspects and seek to demonstrate student engagement as a multidimensional and dynamic concept.

First of all, in the theoretical part of the thesis (section 2) I seek to elaborate what academic engagement is, what processes it is related to, and what factors it depends on by profoundly reviewing definitions, components and antecedents of engagement discussed in research literature from different perspectives. I focus on educational context factors affecting student engagement in particular, as this group of factors is something schools and teachers can influence directly. I adopt the opinion that the concept of engagement has a potential as a metaconstruct (Fredricks et al., 2004), since combination of multiple aspects and their relationships makes it possible to understand and explore students' experiences at school on a deeper level.

Second of all, I empirically explore and analyze how engagement can be affected and shaped by classroom factors (sections 3-5). The data collection was carried out in an authentic primary school classroom environment with a sample of 11 4<sup>th</sup> grade students and their teacher during English language lessons. Process-oriented and context-sensitive data analysis methods were used, which demonstrates dynamics of student engagement as it appears in natural learning contexts.

Finally, section 6 serves as a meeting point of the theoretical and empirical parts of the study. In this section I make conclusions on the basis of main results of the empirical study in the frame of previous research, thus demonstrating engagement as both multidimensional and dynamic concept. A significant part of the findings goes in line with previous research. At the same time, the results of the empirical study suggest some new meanings of already existing aspects, which contributes to our understanding of the concept of engagement on the theoretical level. The results present practical value as well. They are approached from the perspective of classroom teaching practices, and a framework of guidelines aimed at enhanced engagement is introduced based on the findings of the empirical study. In the end, the whole study is evaluated critically from the point of view of ethical issues, validity and reliability, and limitations.

## **2 REVIEW OF PREVIOUS RESEARCH**

### **2.1 Defining student engagement**

When discussing the term “engagement” it can be useful to think of the first associations this concept brings to mind. An engaged learner is most likely to have positive feelings about the task, be interested in the learning activity, or have certain motivation to fulfill the task, or all of those together. In every day use concepts of interest, motivation, and engagement are often assumed to be identical (Järvelä & Renninger, 2014, in press). However, scientific literature makes it clear that these terms do not represent the same concept, even though they are strongly interrelated. It is, therefore, important to approach the concept of engagement taking into account these related phenomena.

#### **2.1.1 Emotions and interest**

Ainley (2006) defines interest as an affective state that represents students' individual experience of learning situations. This affective state can arise either from situational triggers, or a strong personal interest. Therefore, when speaking about interest, it is essential to understand the difference between personal and situational interest. Personal interest is a more stable characteristic that represents an individual's long-lasting attraction to a particular subject or activity and willingness to be engaged in it. Situational interest is a psychological state of liking and being interested in an activity or task because of the interestingness of the task itself or its context (Pintrich, 2003). Ainley (2006) describes situational interest as a transitory characteristic, when a student's attention is focused and feelings are triggered by specific situation.

Interest is triggered and supported to develop by such factors of learning environment as interaction with others and learning tasks (Järvelä & Renninger, 2014, in press). Interest is crucial for student engagement in learning. When students start to work with a task, specific feelings and emotional states are aroused (Ainley, 2006). Certain emotional states trigger and facilitate impulses for further actions and behaviors (Perkun & Linnenbrink-Garcia, 2012), that is, engagement or disengagement (Ainley, 2006). Arousal of positive on-task feelings, such reactions as attention, concentration, alertness, possibly with connections to past experiences, is likely to prompt further thinking and actions related to the task (Ainley, 2006). These activating positive emotions such as excitement

and happiness, can, therefore, enhance academic achievement. While effects of students' enjoyment of learning are beneficial, such emotions as boredom and hopelessness are likely to be detrimental for engagement (Perkun & Linnenbrink-Garcia, 2012).

When educational experiences do not trigger positive feelings in students, those students can be described as disaffected, that is, disengaged (Ainley, 2006). If there is little to no existing interest in the task, some specific situational features should work as a “hook” to engage a student in the activity, unless a student is capable of independently generating strategies to enhance interest in the activity, for example, by approaching the task in a way that makes personal meaning (Ainley, 2012).

Therefore, interest links affect, cognitive activity, and motivation (Ainley, 2006). According to Järvelä and Renninger (2014, in press), the quality of a learner's interest can be predictive of both motivation and engagement.

### 2.1.2 Motivation

Motivation is a larger concept than interest, and it is not necessarily linked to learning of specific content (Järvelä & Renninger, 2014, in press). Generally, motivation in learning is defined as the “psychological drive that leads to cognitive engagement and ultimately achievement” (Järvelä, Volet, & Järvenoja, 2010, p. 16). Wolters (2003) reviews definitions of motivation from the cognitive perspective, and suggests an inclusive view of motivation. He suggests that the term “motivation” can represent both students' level of motivation as a state (i.e., willingness to engage in a task) and the processes that determine that level of motivation (i.e., being interested). Motivation can be intrinsic and extrinsic. When a student is intrinsically motivated, he or she undertakes the activity for its own sake, for getting satisfaction after engaging in the task. In this case students also experience higher levels of interest (Pintrich, 2003). Intrinsic motivation normally results in high quality and creative learning. Motivation can also be extrinsic, when the desire to perform the learning task is determined by external demands, requirements, or rewards. Extrinsic motivation appears when a certain activity is carried out in order to achieve a separable outcome and, therefore, it contrasts with intrinsic motivation (Ryan & Deci, 2000). However, it is important to underline that extrinsic motivation is not necessarily a pale and impoverished form of motivation. Ryan and Deci (2000) suggest that there are different forms of extrinsic motivation, and some of them represent active states. In the latter case, students



perform an extrinsically motivated task with a sense of willingness, demonstrating inner acceptance of the task value. Moreover, Ryan and Deci (2000) argue that being able to promote more active forms of extrinsic motivation is a crucial thing in teaching since many of the learning tasks has nothing to do with supporting or evolving students' intrinsic motivation. Extrinsic motivation can vary in degree to which it is autonomous. More autonomous types of extrinsic motivation were found to be associated with greater student engagement (Connell & Wellborn, 1991).

Järvelä and Renninger (2014, in press) suggest that motivation can not be treated as a developmental construct the same way as interest. While interest can be supported and developed by certain triggering processes, motivation is typically based on personal characteristics of a learner (e.g., self-efficacy and ability to self-regulate). If a learner can self-regulate effectively, he or she is also believed to be motivated. However, a person being able to self-regulate does not imply he or she has interest in the learning content (Järvelä & Renninger, 2014, in press).

Zimmerman (2011) discusses the role of positive motivational feelings in learning, and claims that high motivation increases student attention to the learning process, choice of a task, students' efforts to learn a challenging task, and finally, students' persistence on a time-consuming task. Therefore, motivation plays a big role in initiating and sustaining students' efforts to learn.

According to Järvelä and Renninger (2014, in press), the role of such psychological aspects as interest and motivation is essential in conceptualizing learner engagement, especially when it is related to willingness and ability to continue doing the task when it is hard, self-regulate own behavior in order to complete tasks and achieve learning goals.

### 2.1.3 Engagement

The concept of engagement got its roots in dropout prevention literature, where it was seen as academic engaged time for improving student achievement. The concept has been evolving, and latest conceptualizations differ a lot as take into account a great amount of aspects. Academic engaged time is still considered an important part of the concept, but it is not sufficient to combine all of the schooling goals, which are related to student learning across academic, socioemotional and behavioral domains. Nowadays there are three main schools of thought on student engagement: one arising from school dropout prevention

theory, second from a more general school reform perspective, and finally, third one arising from the motivational literature. In addition to that, there are sub disciplines in the field of psychology that study engagement. Therefore, the study of engagement is complicated by lack of agreement in constructs and definitions. The same term may be used to indicate different concepts, as well as different terms may be used to address one and the same concept. Moreover, this fact makes it difficult to summarize research findings in the field of student engagement (Reschly & Christenson, 2012).

It is not difficult to come across certain differences in the definitions of the term “engagement” in academic literature. Although the definitions share a central idea, different aspects may be emphasized by different researchers. For example, Connell (1990) uses the construct “engagement versus disaffection”. According to this viewpoint, engagement “is viewed as patterns of action reflecting acceptance of and commitment to the goals of learning and successful school performance. Disaffection is defined as patterns of action reflecting a lack of commitment to these goals” (Connell, 1990, p. 87). At the same time, Newmann, Welhage, and Lamborn (1992) provide the following definition of engagement: “Engagement stands for active involvement, commitment, and concentrated attention, in contrast to superficial participation, apathy, or lack of interest” (p. 11). It is not enough for a student to show commitment to complete assignments or acquire high grades. Students may fulfill academic tasks and perform well without being engaged in the mastery of a skill. Student engagement in academic tasks requires psychological investment and effort directed toward mastering the knowledge and skills (Newmann, Welhage, & Lamborn, 1992).

An interesting and quite different definition of engagement can be found in the work by Butler and Cartier (2004). According to them, engagement is “students' active, reflective coordination of learning processes (i.e., self-regulation) in light of metacognitive knowledge and motivational beliefs and in the context of academic work” (Butler & Cartier, 2004, p. 1732). From this perspective, student engagement is extremely close to self-regulation in general.

In this study I build my discussion upon the three-part typology of student engagement. This typology includes three main components in the concept of engagement, and is widely recognized in the scientific literature. Behavioral engagement is based on the idea of participation, and implies involvement in academic and social and/or

extracurricular activities. Emotional engagement includes positive and negative reactions to teachers, peers, and school in general. This component influences willingness to do the work. Finally, cognitive engagement relies on the idea of investment. It implies thoughtfulness and willingness to put the effort which is necessary to understand complex ideas and master advanced skills (Fredricks et al., 2004).

The three types of engagement and their components overlap greatly with a big amount of concepts that have been studied previously under a different label. Due to the big amount of research on how students act, feel and think it is extremely difficult to investigate specific portions of scientific literature under the label “engagement”, which challenges the conceptual clarity (Fredricks et al., 2004). Libbey (2004) argues that there exist multiple terms that are related and may or may not have the same theoretical framework – school engagement, school attachment, school bonding, school climate, school involvement, teacher support, school connectedness, and other. Having reviewed the concepts, however, Libbey (2004) concludes that a lot of features can be singled out across several measures of school connection, for example, a student's sense of being a part of school, student's liking school, degree of teacher support, school friends, engagement in academic progress, fair and effective discipline, as well as participation in extracurricular activities.

Lam, Wong, Yang, and Liu (2012) contribute to the idea of conceptual clarity of student engagement by bringing up such notions as indicators, facilitators and outcomes of engagement. While indicators are “the characteristics that belong inside the construct of student engagement proper, e.g., students' effort and enthusiasm in school work”, facilitators are simply “the causal factors outside of the construct, e.g., teacher support that contributes to student engagement” (Lam et al., 2012, p. 404). It is important to draw a line between the two groups of characteristics, because if facilitators are being considered as a part of student engagement itself, it becomes impossible to investigate how contextual factors affect engagement. In the same manner, it is vital to make a distinction between indicators and outcomes of engagement. Outcomes such as grades and number of credits should not be included in the concept of student engagement itself. Otherwise it is not possible to explore the consequences of engagement. Finally, one more concern addressed by Lam et al. (2012) has to do with the redundancy of the dimensions of engagement. Although the dimensions are not isolated from each other, their core features should not be

overlapping across the dimensions. From this perspective, the three-part typology of student engagement makes the distinction between the dimensions clear. Moreover, indicators in this typology are distinct from facilitators and outcomes (Lam et al., 2012).

One of the ideas that is central to the common understanding of the term “engagement” is the idea of commitment, or investment. However, there can be variations in the quality or level of commitment across each of the three components. Behavioral engagement can vary from just following the given instructions and doing the work to participation in the student council. Emotional engagement can vary from just liking to deep valuing of the educational institution. Cognitive engagement can vary from simple memorization techniques to complex self-regulated learning strategies. Therefore, engagement can vary in intensity and duration: “it can be short term and situation specific or long term and stable” (Fredricks et al., 2004, p. 61).

The idea of qualitative differences in the level of engagement is well supported by a gradation of student prototypes by Connell and Wellborn (1991), which includes three engaged prototypes (innovative, enmeshed, and conformist) and three disaffected ones (rebellious, ritualistic, and withdrawn). Each prototype has different attitudes about schooling approaches to do academic work.

#### 2.1.4 Relations among the concepts

Previous discussion makes it clear that the concepts of emotions, interest, motivation, and engagement are strongly interrelated. Interest, motivation, and engagement are all products of students' interactions with the learning environment (Järvelä & Renninger, 2014, in press). Defining these concepts and their causal relationships demonstrates the difficulty in establishing one single taxonomy of engagement that would include all the relevant perspectives (Ainley, 2012).

Perkun and Linnenbrink-Garcia (2012) argue that emotions, being affected by individual antecedents, social environment and characteristics of learning tasks, can influence student engagement, which in its turn will have an impact on academic achievement. They consider engagement as a mediator between emotions and academic achievement. Meyer and Turner (2006) claim that emotions are bound to the context and arise from it. They speak about positive emotions as indicators of highly supportive interactions and positive classroom environments. They claim that both positive and

negative emotions are crucial for understanding motivation, and engaging classroom climates need to be constantly sustained with the help of positive interactions promoting student involvement in higher level quality learning. Lam et al. (2012) found in their empirical study that positive emotions had the strongest correlation with student engagement. When students reported they were engaged in school, their teachers would report that those students often had positive emotions. In the same manner, the more students reported they were engaged in school, the more their teachers reported about their good academic performance and conduct (Lam et al., 2012).

Ainley (2012) claims that interest is a key construct for investigating the relation between motivation and engagement. According to Fredricks, Blumenfeld, and Paris (2004), interest is a subset of emotional engagement and motivation is a subset of cognitive engagement. However, Ainley (2012) considers interest as a subset of motivation, and defines it as a core psychological process that works as a catalyst for students' interactions with certain learning activities. According to her, interest is “a very specific situational engagement” (Ainley, 2012, p. 286). In this case, one way to draw a line between motivation and engagement is to think of motivation as an “underlying psychological process” and engagement as a “descriptor for the level of involvement or connection between person and activity” (Ainley, 2012, p. 285).

Quite a similar point of view belongs to Gettinger and Walter (2012), who argue that student motivation is willingness to invest time in learning, while student engagement is actual involvement and participation in learning. In their opinion, the extent to which students are motivated to put effort in their learning determines the quality of sustained engagement. From this point of view, motivation is leading to engagement. Engagement, in its turn, mediates the relationship between motivation and learning. However, although it is important to motivate students to engage, in the end it is student engagement that actually contributes to achievement (Gettinger & Walter, 2012).

Interestingly, Reschly and Christenson (2012) argue that cognitive engagement and motivation may actually be very close to each other or even represent the same sub construct.

In spite of the problematic issues in defining engagement, Fredricks et al. (2004) argue that engagement has a potential as a multidimensional construct which combines three components (emotional, behavioral, and cognitive) in a meaningful way. They

suggest that it is possible to think of engagement as a metaconstruct. Combination of behavior, emotion, and cognition under the notion of engagement is valuable because it is likely to provide a better characterization of students than research on single components (Fredricks et al., 2004).

The theoretical framework of student engagement has a lot in common with the theory of self-regulation. In fact, the definition by Butler and Cartier (2004), mentioned previously, demonstrates that the two are extremely close. Cleary and Zimmerman (2012) acknowledged that although these constructs are targeted by different lines of research, they are highly related and complementary. In the following section similarities and differences between the two theories are discussed in more detail.

## **2.2 Student engagement and self-regulation**

The aim of this section is to have a closer look at the theories of engagement and self-regulation and demonstrate the similarities and differences between them according to the perspective of Wolters and Taylor (2012). I would like to emphasize that this section represents a summary of their ideas and examples, which were found highly relevant in the frame of this thesis.

The argumentation in this section is built upon and illustrated by the model of self-regulated learning by Pintrich (2000), which includes four phases (planning, monitoring, control, and reflection) and happens across four areas (cognition, motivation, behavior, and context). Zimmerman's (1989) perspective on the theory of self-regulated learning is also taken into account. The perspective of Fredricks et al. (2004) on the theory of student engagement and the three-part typology of student engagement is adopted.

Wolters and Taylor (2012) claim that the first argument proving that the two theories have a lot in common is that both of them are needed to better understand how students function at school, and why some students are academically successful while others are not. According to them, there are three clear similarities between the two theories. One, the research on both theories includes different models which share core elements but still show variation to some extent. Two, both self-regulated learning and student engagement are multidimensional as they consider different aspects and areas of students' academic functioning on a more global level. Behavioral, cognitive and emotional aspects are taken into account in both theories. Three, both of the theories are treated as

mediating processes that establish a bridge between contextual and personal factors on one side and student's school performance on the other one (see Pintrich, 2000; Fredricks et al., 2004).

However, as Wolters and Taylor (2012) claim, what is even more important in conceptualizing self-regulation and engagement is that definitions of each of them often include concepts that are central to the other one. For example, according to Wolters (2003) self-regulated learners are those who are actively engaged in own learning. When talking about phases of self-regulated learning, theorists usually do not claim that they happen in a rigid order in a linear fashion (see Pintrich, 2000; Zimmerman, 1989). The phases only provide a structure and underline that self-regulated learning is dependent on students' engagement before, during and after fulfilling a learning task. Self-regulated learners are expected to be able to engage and re-engage in the task at any time and phase in order to complete the task successfully. At the same time, from the perspective of Fredricks et al. (2004), use of self-regulation strategies is one of the components necessary for student engagement.

Wolters and Taylor (2012) present a deep comparison of the theories of self-regulated learning and student engagement, and discuss both similarities and differences between them. First of all, they point out that there is a big conceptual overlap when considering the area of cognition and cognitive engagement. Metacognitive activities performed by both self-regulated learners and cognitively engaged learners include such strategies that reflect planning, goal setting, and monitoring (see Fredricks et al., 2004; Pintrich, 2000). Wolters and Taylor (2012) note that both theoretical frameworks believe that more effective and higher quality engagement happens when students use a set of cognitive and metacognitive strategies. Moreover, there is also conceptual agreement when discussing emotional and affective aspects. Students who are considered self-regulated are likely to have more positive experiences in academic environment (Pintrich, 2000). At the same time, positive emotions such as interest and happiness have been considered indicators of student engagement (Connell & Wellborn, 1991; Skinner & Belmont, 1993; Ainley, 2006; Perkun & Linnenbrink-Garcia, 2012). In the same way, the two theories share the assumption that overt behavior is an important factor of students' academic functioning that needs to be understood. Students who are involved in learning tasks demonstrate more overt behavior that reflects effort and persistence (Wolters & Taylor,

2012).

However, according to Wolters and Taylor (2012), differences between the two theories become obvious when one starts examining the components of each framework. First of all, there are differences in how similar concepts are categorized. For example, while motivation has been an important part of self-regulation since the inception of the theory, it has been included in the framework of student engagement only recently. Within most research on self-regulation, motivation is often considered separate from other areas, especially cognition and metacognition. The distinction and relation between motivation and cognition is less well established in the framework of student engagement. Here motivation is not so often considered separately. It is usually integrated into what it means to be cognitively and emotionally engaged (see Fredricks et al., 2004; Reschly & Christenson, 2012). Secondly, Wolters and Taylor (2012) note that researchers from both frameworks agree that students' metalevel knowledge about the self, tasks, and strategies are crucial. However, descriptions of self-regulated learning move beyond this conceptualization and incorporate also metalevel knowledge that provides the basis for such areas of academic functioning as, for example, planning and monitoring. Finally, Wolter and Taylors (2012) notice that the models of self-regulated learning have emphasized the students' ability to assume a strategic and agentic role across many different aspects of their academic functioning. Models of student engagement do not stress this type of agency when considering students' academic functioning (except for the importance of metacognition). Models of student engagement allow that engagement can *result from* a diverse set of influencing factors such as context, social factors, family, and instructional factors. Models of self-regulated learning acknowledge these factors, but focus on how they influence students' efforts to *manage* their own learning (Wolters & Taylor, 2012).

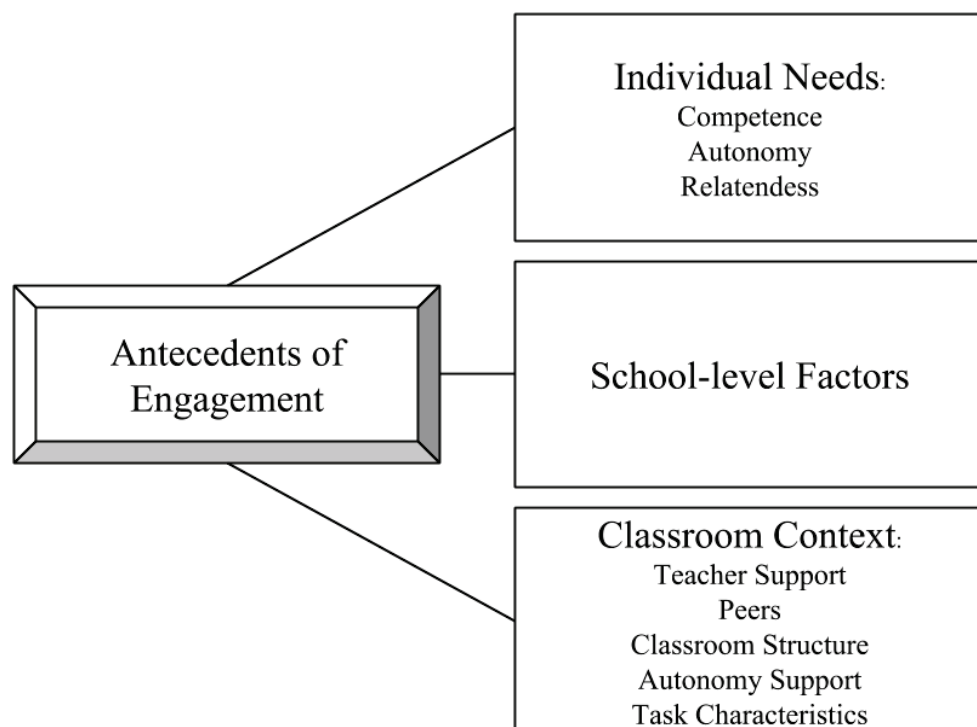
The last difference between the theories of self-regulation and student engagement pointed out by Wolters and Taylor (2012) is crucial in terms of my study. In order to understand the essence of student engagement and how it is shaped, it is necessary to have a closer look at factors that affect it. In the following section I provide an overview of such factors. I adopt the perspective of Fredricks et al. (2004) and build my discussion upon their classification of antecedents of engagement (see Figure 1). In their work they review previous research on student engagement emphasizing the educational context point of



view and such aspects about which school and teachers could possibly undertake some actions. This classification is a widely recognized review work on engagement, and it provides a detailed overview of factors affecting student engagement discussed in the research literature. In order to support the original classification I complement it with findings from related research papers that I studied. In addition, I briefly consider educational technology as a tool to promote student engagement through learning tasks. Finally, I discuss the research findings from the perspective of common lines.

### 2.3 Factors affecting student engagement

Fredricks et al. (2004) discuss three broad groups of factors of educational context that have an impact on student academic engagement (see Figure 1). They point out individual needs, school-level factors, and classroom context.



*Figure 1.* Classification of antecedents of student engagement according to Fredricks, Blumenfeld, and Paris (2004).

#### 2.3.1 Individual needs

Individual needs can be explained through Connell's (1990) self-system model. According to this model, individuals have basic psychological needs for relatedness, autonomy, and

competence. The need for competence means the need to perceive oneself as capable of achieving desired aims and avoiding negative outcomes. The need for autonomy is the need of opportunity to make own choices during initiating, maintaining and regulating an activity and the need to see a connection between own actions, goals and values. The need for relatedness means that a person needs to feel the secure connection to the social surrounding and perceive self as a worthy part of it (Connell, 1990).

When psychological needs are being met within particular cultural enterprises such as family, school or work, engagement will occur and be manifested in affect, behavior, and cognition. Conversely, when psychological needs are not being met, disaffection will result along with its adverse effects on these same action components (Connell & Wellborn, 1991, p. 52).

This perspective is supported by other researchers (see Skinner & Belmont, 1993).

According to Newmann et al. (1992), need for competence is a highly significant factor affecting student engagement. They believe that most people have a strong need to develop and demonstrate competence. It feels rewarding when one achieves cognitive understanding and skill mastery, especially since they give people the opportunity to have some impact on the world. When efforts to act with competence result in success, this causes continued investment, and the cycle continues. The need for competence has been considered one of the most powerful reasons of human motivation (Newmann et al., 1992). Perkun and Linnenbrink-Garcia (2012) also note that a student's feeling of competence to meet the demands of the task together with interest in the task is likely to result in enjoyment of learning, while feelings of incompetence and disinterest are likely to make studying not enjoyable. Porto (2007) found that self-perceived competence was one of the factors affecting motivation and student engagement in her college classroom.

Connell and Wellborn (1991) studied how particular individual needs are associated with school engagement and disaffection. Thus, having studied perceived competence in a sample of 4<sup>th</sup> to 6<sup>th</sup> grade students, they found that the rebellious and ritualistic student prototypes believed that the way to do well in school was to please teachers. The withdrawn prototypes reported that it was luck which was the main in school, and they did not have it. Withdrawn students also reported that they were not able to get the teacher like

them. From the same sample they found that children with higher levels of perceived autonomy were more engaged in class according to their teachers, and showed better performance. They also discussed the importance of perceived relatedness. Having carried out a study with a sample of 3<sup>rd</sup> to 6<sup>th</sup> grade students, they demonstrated that children's relationships with parents, emotional security with classmates and teachers predicted school engagement, which in its turn predicted performance (Connell & Wellborn, 1991).

Lam et al. (2012) recognize personal characteristics – such motivational beliefs as goal orientations, self-efficacy, and attribution – as an important group of factors affecting student engagement. They claim that these personal factors may mediate the effect of contextual factors on engagement. Thus, in their empirical study with 822 Chinese junior secondary school students Lam et al. (2012) found that self-efficacy had a high correlation with engagement: the more students believed they were capable of being successful with a learning task, the more they engaged on the three levels (emotional, cognitive, and behavioral). They also found that both learning and performance approach goals were positively associated with engagement (learning goals having the strongest correlation). In the same manner, the more students attributed their academic achievement to own efforts, the more they were engaged in learning, unlike the students who attributed their achievement to uncontrollable factors, for example, teaching strategies of the teacher, luck and situation (Lam et al., 2012).

Anderman and Patrick (2012) claim that when a students' goal orientation is mastery toward a particular assignment, emotional, cognitive and behavioral engagement is likely to be adaptive for learning, since task mastery requires high levels of engagement. When students are focused on mastery, they tend to think deeply about academic work, apply effective learning strategies, have positive affect about school, and demonstrate positive academic behaviors. Although evidence about students with performance goals is mixed, there have been no positive links found between performance avoidance goals and cognitive engagement, and it has been found that performance goals are related to negative academic behaviors (Anderman & Patrick, 2012).

### 2.3.2 School-level factors

School-level factors that can influence engagement are, for example, school size, opportunities for students to participate in extracurricular activities and school

management, and school disciplinary practices (Fredricks et al., 2004).

Newmann et al. (1992) argue that the degree to which students experience membership at school is an important factor influencing engagement. The problem here is that for many students school represents aimlessness, inequity, humiliation, and failure. For some other students school seems a meaningless ritual unrelated to their actual concerns. The authors suggest that schools are most likely to promote a sense of membership in students if they offer clarity of purpose, equity, personal support, opportunity for all students to achieve academic success, and if all those features are integrated into a climate of caring (Newmann et al., 1992). All these features are further discussed in more detail from the perspective of Newmann et al. (1992).

Clarity of purpose can be decreased by hypocrisy (i.e., claiming to strive for goals which are in reality not pursued) and by aimlessness (i.e., failing to push for any goals, or adopting multiple conflicting goals). Schools with diverse student populations have hard times specifying purposes clear enough to enhance students' sense of membership (Newmann et al., 1992).

Fairness is often decreased in schools by violations of due process in disciplinary issues and by inequity in provision of opportunities. Although discrimination based on race, gender, or religion may seem rare, in many schools students of low socioeconomic status with poor grades experience inequity. When schools strive for fairness through inclusion, it results in improved sense of school membership in students, which in its turn advances student engagement in school work (Newmann et al., 1992).

In general, learning includes risk taking: when one is trying to learn something new, there is no guarantee for success. It is likely that there will be mistakes and one will have to try again. Unless one can trust teachers and peers and know they will offer support and help for correcting those mistakes, the learning process can be too difficult to try (Newmann et al., 1992).

One of the most important tasks of school is to make sure that students experience success during the development of competence. Sense of school membership will be increased when the school is seen as an organization that offers opportunities for meaningful success. However, sense of success can not be achieved by grade inflation or reducing the level of academic demands. Instead, school work should be designed in such a way that significant challenges are presented, criteria for authenticity are met, personal

support is offered. Success must be achievable for all students (Newmann et al., 1992).

In conclusion, to build the sense of school membership, the features that were just described (purpose, fairness, support, and success) have to be integrated within the climate of caring. This means a climate where all students are worthy and important for the school, and the school is ready to help each of the students to develop competence (Newmann et al., 1992).

Having overviewed research literature, Fredricks et al. (2004) conclude that for the most part school-level factors are connected with behavioral engagement, while there is no strong link between school-level factors and cognitive and emotional engagement.

### 2.3.3 Classroom context

The third group of antecedents, classroom context, is the largest one and consists of five components (see Figure 1): teacher support, peers, classroom structure, autonomy support, and task characteristics.

#### *Teacher support*

Having reviewed previous research, Greene and Azevedo (2007) demonstrate that teachers have a great influence on the context, following students' actions, and student engagement through classroom teaching practices. Basing their argument on previous research findings, Greene and Azevedo (2007) illustrate the importance of teacher's encouraging motivation and collaboration, providing appropriate feedback, having higher expectations, and providing tasks with multiple goals for student engagement. In the review of previous research, Fredricks et al. (2004) show that teacher support has an impact on behavioral, emotional, and cognitive engagement.

Skinner and Belmont (1993) acknowledge three dimensions of teacher behavior – involvement, autonomy support, and structure. They explain the term “involvement” as “the quality of the interpersonal relationship with teachers and peers; its opposite is rejection and neglect” (Skinner & Belmont, 1993, p. 573). In their study, they examined effects of these three aspects of teacher behavior on 144 primary school children's behavioral and emotional engagement during a school year. They found that teacher involvement was central in children's perceptions of the classroom, and had positive association with engagement. In its turn, higher student engagement caused higher teacher

involvement. Teacher provision of autonomy support and structure (these concepts will be discussed at length further) predicted children's motivation during the academic year. They also found reciprocal effects of student motivation on teacher behavior (Skinner & Belmont, 1993). This work by Skinner and Belmont (1993) can be called exceptional, because the most part of the research on teacher support and behavioral engagement has been cross-sectional rather than longitudinal and made it difficult to check reciprocal links, as well as learn about the long-term consequences of teacher involvement on different types of engagement (Fredricks et al., 2004).

Speaking about cognitive engagement, there have been observational studies (e.g., Stipek, 2002) which proved that a socially supportive and intellectually challenging environment is beneficial for students. It was found that teachers, who pressed for understanding and supported autonomy, at the same time being respectful and supportive, had more strategic students with higher behavioral engagement and affect (Stipek, 2002).

Pianta, Hamre, and Allen (2012) argue that the nature and quality of interactions between the teacher and students are fundamental for understanding the essence of student engagement. They discuss three features of classrooms that are likely to influence levels of engagement – relational supports, competence supports, and relevance. For many young people, regardless of age or grade, relationships with their teachers are crucial to core developmental processes. In addition, classrooms where the teacher is over- or underinvolved, are likely to be lacking engaged students. Finally, the connection of academic skills to the real life has a great impact on student engagement. Today's generation of children and adolescents who have been growing up with the Internet and social networks has difficulties in finding how classroom materials relate to the larger world. Teachers can increase the relevance of the classroom by creating repeated and explicit connections between school materials and the real world. Pianta et al. (2012) discuss the Teaching Through Interactions framework, which emphasizes three major domains of classroom interactions – emotional supports, classroom organization, and instructional supports. Teacher's role is demonstrated to be highly significant in creating emotional climate in the classroom; in addition, the teacher is expected to be sensitive and responsive to individual needs of students, as well as structure the interactions around the interests and motivations of the students. A good teacher is capable of engaging the students, using classroom time constructively and productively, relies on different formats

of teaching, and provides opportunity for interaction in order to foster student engagement. Moreover, a good teacher pays attention to students' development of concepts and higher order thinking skills, provides feedback and promotes students' language use by offering high levels of language modeling (Pianta, Hamre, & Allen, 2012).

A framework of teaching practices for increasing academic engaged time suggested by Gettinger and Walter (2012) presents similar ideas. Gettinger and Walter (2012) single out three main groups of practices. Managerial practices are aimed at reducing the amount of instructional time that is spent on noninstructional activities, such as monitoring student behavior, minimizing classroom disruptions, reducing transition time, and establishing effective classroom routines. Instructional strategies focus on promotion of interactive teaching with high levels of student responding, as well as providing challenging tasks, promoting student autonomous motivation through providing student choice and establishing meaningful goals, providing effective instructions, as well as using diverse teaching methods. Finally, student-mediated strategies focus on supporting cognitive engagement and self-regulated learning skills in students (Gettinger & Walter, 2012).

Lam et al. (2012) recognize social relatedness as a large group of contextual factors influencing engagement. They include teacher support, parent support, peer support, aggression to peers, and aggression from peers to this group. In their empirical research they found that student engagement was closely related to all of these factors. However, teacher support turned out to have a stronger association with engagement, than peer and parent support (Lam et al., 2012).

It is important for teachers to take into account both academic and social issues in the classroom. If teachers focus only on academics, but social environment is negative, students are likely to be emotionally disengaged and more apprehensive about making mistakes. At the same time, if teachers focus only on social aspects but do not pay enough attention to academics, students are less likely to be cognitively engaged in the classroom (Fredricks et al., 2004).

### *Peers*

The opinion that social interactions in classroom have a great impact on student motivation at school is supported among researchers. For example, Pintrich (2003) highlights the importance of social cognitive constructs in current motivational research and their role in

building individual student motivation. Significance of social context and environment in student self-regulation is reflected in Zimmerman's (1989) social cognitive view of self-regulated learning, which includes environmental conditions such as support from teachers and fellow students.

Social conceptualizations of motivation can be approached differently. For example, motivation to engage in learning can be regarded as a psychological phenomenon which is influenced by social context (Järvelä et al., 2010). The study by Dowson and McInerney (2003), for instance, demonstrates that students' goals to engage in academic activities are often dependent on social context and other participants. On the other hand, motivation can be approached as a social phenomenon, and engagement – as an enacted motivation. In this case, engagement (or enacted motivation) is socially created and maintained through the processes of co-regulation (Järvelä et al., 2010). Hickey (2003) discusses the model of co-regulated learning as one of the most well-known socially-oriented models of engagement, which focuses on relationships, social supports and interactions that allow an individual to seek for new challenges in that scaffolded environment. Students are supposed to internalize those supports in such a way that will later enhance their ability to take part in school activities. From a sociocultural perspective, “engagement is a function of the degree to which participants in knowledgeable activity are attuned to the constraints and affordances of social practices and identity” (Hickey, 2003, p. 411). Hickey (2003) points out, however, that regardless of perspective, all motivational practices in the end are about making and keeping students engaged in learning.

Impact of interactions with peers on student engagement has been explored on different levels. For example, evidence from studies by Ladd, Birch, and Buhs (1999) which were conducted with kindergarten children, proves that children's early behavioral characteristics have an impact on the relationships they build with teachers and peers. These relationships were found to provide affordances to facilitate, or, on the contrary, create constraints and impede early school adjustment. Children who were successful in building supportive relationships were found to develop adaptive styles of classroom participation, which led to higher achievement. At the same time, stressful aspects of relationships were found to be capable of creating enduring obstacles for school engagement and attainment (Ladd, Birch, & Buhs, 1999). Lam et al. (2012) studied the



connection of aggression to peers and aggression from peers to academic engagement. Interestingly, they found that aggression to peers had a stronger association with engagement than aggression from peers. In other words, bullies had bigger chances to disengage from school than their victims who got bullied. Fredricks et al. (2004) mention that peer acceptance and peer rejection predict such aspects of behavioral engagement as participation, conduct and work involvement, and such aspects of emotional engagement as interest and satisfaction in school.

One of the current topical research issues is motivation and engagement in collaborative and socially shared learning situations. Generally, Resta and Laferrière (2007) having reviewed previous research, demonstrate that students who have a chance to engage in interaction with peers have more positive attitudes toward the subject, higher motivation to learn about it, and they are more satisfied with the learning experience than students who have little opportunity to interact with their peers and teacher. At the same time, in collaborative learning situations individual motivation and learning skills are often challenged by a variety of factors: social skills, individual differences, cognitive conflicts, or different communication styles (Määttä, Järvenoja, & Järvelä, 2012; Järvelä, Hurme, & Järvenoja, 2011; Dillenbourg, Järvelä, & Fischer, 2009). It is crucial that members feel safe and free to take risks and share ideas during collaborative learning situations (Järvelä et al., 2011, Dillenbourg et al., 2009). Socially shared metacognition is extremely important for successful collaborative learning (Hurme, Merenluoto, & Järvelä, 2009) in order to regulate group's cognitive activity and reach meaningful thinking about solving the problem (Järvelä et al., 2011). The quality of collaborative work, however, may depend on the participants' enthusiasm and will to engage in the task as much as on their knowledge and experience about resolving cognitive conflicts. Collaboration may provoke different emotions which cause greater or lesser task engagement (Crook, 2000). Positive emotions generally seem to support sociobehavioral engagement, while negative emotions usually undermine it (Perkun & Linnenbrink-Garcia, 2012). Engagement, in its turn, determines how well cognitive skills are mobilized and put in action (Crook, 2000).

These challenges make it difficult to maintain motivation in a group. Therefore, skillful coordination of interactions is necessary to keep the work going on and to restore engagement (Järvelä et al., 2010). Although there exist many recommendations about how teachers should interact with groups, there is not that much empirical evidence about

particular interventions aimed at improved group functioning. However, recent research findings demonstrate that effects of teacher's help depend a lot on how well teachers connect their help to the ongoing work processes in the group. The findings demonstrate the importance of teacher's careful evaluation of group progress before deciding to intervene (Webb, 2009). Coordination can be also provided by the teacher, for example, in a form of a collaboration script that would map a specific interaction pattern within a collaborative group. Ideally, collaborative and self-regulatory skills promoted by external scripts from the teacher are internalized by students over time (Weinberger, 2011). Coordination can also be realized by group members themselves. However, individual regulation of own motivation (i.e., self-regulation) is likely to be not enough, and it could be complemented with co-regulation (individuals assisting each other's regulation), and shared regulation (some or all group members regulating themselves together to achieve a shared goal) (Järvenoja & Järvelä, 2009).

For example, Järvelä, Järvenoja, and Veermans (2008) examined how students regulate their motivation in socially shared learning. They observed higher education students working in groups and coded their regulation of motivation into six categories, using a modified framework of motivational regulation strategies by Wolters (2003).

Määttä, Järvenoja, and Järvelä (2012) carried out a case study aiming at finding out what triggers efficacious interaction among primary school children in collaborative learning situations. They identified three categories of triggers that affected student interaction during collaboration: individual progress, group progress, and contextual triggers. Määttä et al. (2012) documented that it was the group progress trigger that most often increased activity in the group, and only rarely decreased it. A group progress trigger refers to positive or negative statements or actions made by peers (Määttä et al., 2012).

Rogat and Linnenbrink-Garcia (2011) investigated cognitive and behavioral social regulatory sub-processes in upper-elementary students. They distinguished two types of strategies used in groups to maintain on-task behavior – low and high level strategies. If group members tried to involve other group members with a portion of a task, or engaged other group members by promoting a feeling of sense of a team that was considered a high level strategy since it called for sustained task involvement. In contrast, low level strategies were about mere gaining attention, for example quick reminders focusing on time limits such as “Hurry up!”, behavioral signals such as banging on the table or pointing to the task,

mentioning an answer to the task or asking in general what a group should be doing, and simply allowing for other group members' off-task behavior. Rogat and Linnenbrink-Garcia (2011) also came to the conclusion that positive interactions in a group facilitated social regulation, while negative interactions had an opposite effect. Positive socioemotional interactions supported behavioral engagement by helping groups restore and sustain it effectively. According to their perspective, negative group interactions can be especially harmful because they interfere with communication among group members, which is crucial for engaging in planning and monitoring processes as a group. Moreover, negative group interactions may provoke off-task behavior by discouraging group members to participate. Such off-task behaviors may challenge students' regulation of on-task engagement (Rogat & Linnenbrink-Garcia, 2011).

#### *Classroom structure*

Classroom structure implies clearly communicated and optimally challenging expectations for and consequences of individual actions, as well as consistent administration of the consequences, and provision of relevant feedback (Connell, 1990; Connell & Wellborn, 1991). Lack of structure at home and school contexts causes students' confusion about adult expectations. The concept of structure is closely related to students' understanding of what strategies are effective for being successful at school (Connell, 1990). Teachers can provide structure by stating their expectations clearly, responding consistently and predictably, offering help and support, as well as modifying their teacher strategies depending on the features of the child. Teachers who provide structure have students who are more behaviorally engaged (Skinner & Belmont, 1993).

An important aspect to be discussed in connection with classroom structure is task instruction. Butler and Cartier (2004) suggest that task interpretation is the first phase of task engagement, and is, therefore, crucial for the whole learning process. The way students interpret and understand a task and its requirements is an important work habit that is foundational to successful task engagement. Understanding task requirements correctly, students can organize further learning activities accordingly and effectively. If a student does not interpret a task properly, he or she can work hard, but the efforts will not be focused on properly set learning goals (Butler & Cartier, 2004). Therefore, the way the teacher is providing task instructions and communicating expectations is highly significant

for students' choice of relevant and effective way to work.

Guthrie and Cox (2001) describe classroom conditions enhancing engagement in reading. A considerable part of the conditions is related to the practices of classroom structure. For example, instructional goals are constructed to emphasize conceptual understanding of a specific topic within a domain. An opportunity for students to make choices, have interaction with objects as they could possibly appear in their natural environment, and relevant texts are provided to students. The teacher explicitly explains strategies that would allow students obtain relevant knowledge. Moreover, the teacher promotes social interchange around learning content. Finally, students are evaluated individually regarding their personal progress, rather than compared to their peers. Teaching practices for judging student work are compatible with the learning goals both of the teacher and students (Guthrie & Cox, 2001).

Anderman and Patrick (2012) claim that according to the goal achievement theory, students' motivational beliefs depend not only on their personal characteristics, but also on the context where they learn. During a considerable amount of time they spend in classroom they build a vision about purpose of schooling from their experiences of what is emphasized in their classroom. And that is where the notion of classroom goal structure goes in – students' subjective perceptions about purpose and meaning of engaging in school work. A classroom goal structure may emphasize, for example, aspects of mastery goal orientation, where understanding is valued, or performance goal orientation, which emphasizes outperforming others. Classroom goal structure has an influence on students' personal goal orientation. Teachers play a big role in establishing classroom goal structure through communicating purposes of schooling and academic tasks, and explaining the role of a student and learning. A classroom mastery goal structure usually determines high levels of engagement, while a classroom performance goal structure is generally associated with less conducive student beliefs and behaviors (Anderman & Patrick, 2012).

### *Autonomy support*

Autonomy support refers to the provision of choice, opportunity for initiative, recognition of feelings, and a feeling that activity is related to individual values (Connell, 1990; Connell & Wellborn, 1991). If autonomy support is lacking, students feel controlled and pressured towards specific goals. On the contrary, contexts where autonomy is supported,

have a positive impact on engagement (Connell, 1990). Skinner and Belmont (1993) underline that absence of external rewards and pressures is particularly essential in fostering autonomy.

However, researchers have been wondering about the perfect combination of autonomy support and classroom structure that would promote engagement. Therefore, more research on the consequences of choice and opportunities for decision making for engagement is needed (Fredricks et al., 2004). Skinner and Belmont (1993) write:

A key issue is the relationship among these dimensions of teacher behavior: Does too much structure lead to the experience of a rigid, coercive classroom that is devoid of autonomy support? Does too much autonomy support lead a student to feel abandoned, neglected, and longing for more teacher involvement? (p. 573).

Positive effects of classrooms with autonomy support also depend on the match between individual competences and needs for autonomy on the one side, and on the other side it is important to evaluate the affordances of these classrooms. Mismatch may lead to loss of control and appearance of negative emotions (Perkun & Linnenbrink-Garcia, 2012).

Thus, Perry and VandeKamp (2000) explored and described high-self-regulated learning primary school classrooms. According to their observations, teaching and learning activities that were taking place in such classrooms, were engaging for students, and could be characterized by a number of common features. Students in these classrooms both received instrumental support from their teachers and had many opportunities for choice and controlling challenge. While providing their students with explicit instructions and extensive scaffolding, the teachers in those classrooms left space for the students to choose what to read and write about themselves (Perry & VandeKamp, 2000).

Porto (2007) implemented a research project with 95 college students, one of its aims being to find out how learners' written reflections in learning diaries contributed to the development of learner autonomy over time. The results showed that by writing diaries the learners developed reflection and critical thinking which led to greater autonomy (Porto, 2007).

*Task characteristics*

According to Newmann et al. (1992), school tasks that students have to complete often consist of meaningless procedures, mechanistic reproduction of information, and superficial forms of learning that offer little opportunity for students to think critically and understand deeply. Ideally all forms of school work could be more meaningful for students. The idea of learning tasks being meaningful for students is also supported by Järvelä and Renninger (2014, in press). According to them, when learners just start their work in a specific topic they may have low interest, motivation, or engagement because they have not yet managed to establish relevant connections to it. Therefore, design needs to demonstrate them the utility and relevance of the content. Learners need to make connections between the real life and the learning content. For those students who have more developed interest, motivation, and engagement, design has to provide the opportunity to continue deepening their thinking and understanding. Activities allowing multiple ways of reaching and working with the content are likely to promote student engagement. Interactions with disciplinary content need to be accordingly scaffolded for students with different levels of interest, motivation, and engagement (Järvelä & Renninger, 2014, in press).

Newmann et al. (1992) approach authentic work as an extremely significant group of factors affecting student engagement, and define it as tasks that are “considered meaningful, valuable, significant, and worthy one's effort, in contrast to those considered nonsensical, useless, contrived, trivial, and therefore unworthy of effort” (p. 23).

First of all, Newmann et al. (1992) claim that extrinsic rewards have to be valuable for students. Moreover, students have to believe that their hard work will result in academic achievement that will lead to those rewards. In this case it would be possible to expect increased student engagement. However, the problem is that some powerful extrinsic rewards (e.g., a good job) require long-term effort, rather than short-term engagement. Therefore it is challenging for teachers to offer valuable extrinsic rewards. Nevertheless, many tasks can be rewarded in the form of social approval, grades, public displays of outstanding results, and special privileges (Newmann et al., 1992). However, Hickey (2003) notices that offering salient extrinsic rewards in practices where value is created can have problematic consequences as well. For example, publishing the best essay in the school paper may lead to some students withdrawing from participation. Although

those students may like the activity and value the reward, they may disengage because they do not believe they can succeed (Hickey, 2003).

However, even if extrinsic rewards are valuable, level of students' investment depends on how interesting they find the material. What is perceived as interesting depends not only on the subject or topic itself, but also on the way the material is presented by the teacher, as well as students' prior experience with similar material (Newmann et al., 1992).

According to Newmann et al. (1992), students need some influence over the work they do in order for them to be engaged. This includes flexibility in the speed and procedures of learning, opportunity to ask questions, constructing knowledge in own language rather than reproducing the language of others. Of course, there must be reasonable limitations on the extent to which students can control own learning. But even when certain facts, algorithms and processes of learning are established, students' sense of ownership can be promoted if there is some autonomy in the way how students study and apply the material (Newmann et al., 1992).

Students often say that school work is irrelevant, not related to real life issues, competencies or concerns. Newmann et al. (1992) distinguish four qualities of adult work in the real life that are often missing in schoolwork: value beyond instruction (i.e., impact of particular actions on others and students themselves in the real world, beyond school context), clear feedback (engagement is suffering when feedback is delayed and mystified), collaboration (typical activities at school imply working alone, when in real life people have to count on the help of others), and flexible use of time (meaningful achievements in real world often can not be produced within strictly set time period as it is required at school). The focus on authentic practice is also emphasized by Sawyer (2008), as students learn deeper knowledge when they engage in the activities similar to usual activities of professionals who work in this field. The need for creating flexible (in terms of time and space) and challenging (allowing for problem solving and knowledge building) learning environments is mentioned by Resta and Laferrière (2007).

In the end, one should not underestimate the importance of fun and humor in school tasks. Learning activities should offer opportunities for interaction and imagination (Newmann et al., 1992).

Findings by Porto (2007) go in line with previous description, as she found that motivation in her classroom was enhanced when students perceived the tasks attractive,

meaningful, valuable, interesting, and achievable.

Lam et al. (2012) speak about instructional contexts as a group of factors having an impact on student engagement. They include such components of motivating instructional contexts as challenge, real-life significance, curiosity, autonomy, recognition, and evaluation. In their study, Lam et al. (2012) found that the more students perceived their teachers assigning challenging tasks, integrating real-life significance to the tasks, supporting their curiosity and autonomy, recognizing their effort of progress, and using formative evaluation, the stronger their intrinsic motivation in learning was. The practice to integrate real-life significance to the tasks was found to have the highest correlation with engagement (Lam et al., 2012).

The importance of challenging tasks for student engagement is widely highlighted among researchers. For example, Stipek (2002) conducted a study in the mathematics classroom and observed that when students had more opportunities to work with conceptual issues underlying problem solving, they were more motivated to reach mastery, and they experienced more positive emotions while working. She concludes that challenging, conceptual, and analytic thinking is more likely to foster feelings of competence in children than isolated skill practice would do. Moreover, challenging work is more likely to result in visible improvements in understanding (Stipek, 2002).

Newmann (1992) discusses the importance of challenging student thinking in the context of school engagement. He claims that to engage students it is necessary to not just to built the conversation on their own ideas, but also challenge them to think – make them interpret, analyze, or manipulate information. Students are more likely to be engaged, concentrated, and to find academic work interesting when they are challenged to think. Newmann (1992) discussed six indicators of classroom thoughtfulness, in which the teacher plays an essential role: there should be sustained examination of few topics instead of superficial coverage of many, a lesson has to be coherent and consistent, enough time should be given to students to think through the questions and prepare answers, the teacher has to ask challenging questions and give challenging tasks in order to prompt higher order thinking, the teacher should be a model of thoughtfulness by demonstrating own way of thinking through a particular problem, and students should have a chance to provide explanation for their conclusions (Newmann, 1992).

The idea of tasks being open-ended, complex, and cognitively demanding is also



supported by Perry and VandeKamp (2000), who explored primary school students' engagement in reading and writing. They underline that it is important for the teacher to communicate to students that challenge is a good thing, and making mistakes is important, since mistakes help understand what needs to be learned next, and they should be viewed as opportunities to learn (Perry & VandeKamp, 2000).

*Educational technology as a tool to promote engaging learning tasks*

Zimmerman and Tsikalas (2005) argue that computer-based learning environments are capable of supporting various self-regulatory processes in students across all the phases of self-regulation. Technology can support and promote many of the task characteristics beneficial for student engagement and self-regulation. For example, Ang and Wang (2006) carried out an empirical study where they investigated effects of a three-dimensional virtual learning environment Active Worlds on learning engagement of 10 underachiever primary school students in the science class. They found that students were engaged in the task behaviorally, emotionally, and cognitively. Students were more active and engaged in collaborative activities. The task appeared authentic and quite challenging for them. At the same time the students noted they they enjoyed the task also because of the game-like environment that made learning more fun (Ang & Wang, 2006).

Bulger, Mayer, Almeroth, and Blau (2008) explored engagement of 139 college students in computer-equipped classrooms. They found that interactive lessons can increase student engagement in computer-supported lessons where technology can serve as an effective classroom resource of authentic information. Educational technology being a tool for working with primary sources is addressed by Lindquist and Long (2011). They highlight the potential of technology to be a cognitive tool that advances students' critical thinking skills rather than simply makes traditional learning activities more convenient.

However, the challenges that technology might bring into teaching practices have to be taken into account. First of all, teachers' proficiency level in using technology, as well as classroom management skills, is a crucial factor for successful integration of it into the learning process. Moreover, the teacher has to be always available for help if a student is experiencing technical problems, because in this case a student is likely to disengage from the activity (Ang & Wang, 2006). Characteristics of learners and their level of technological proficiency is a very important aspect that needs to be taken into account

when computer-supported learning activities are designed as not everyone may appear to be comfortable with technology (see Montgomery, Sharafi, & Hedman, 2004). At the same time, a crucial aspect of integrating Internet-connected technology into the classroom is that a computer can be potentially distracting if an activity is not designed adequately (Bulger, Mayer, Almeroth, & Blau, 2008). In addition, even if the activity is relevant and meaningful, it is important to remember that availability of authentic information through technology calls for development of new 21<sup>st</sup> century skills in students, one of them being able to distinguish relevant from irrelevant and subjective from objective, thus judging the credibility of information (Binkley et al., 2012; Dede, 2009). In any case, the main principle of integrating technology in classroom teaching practices should be always kept in mind – use of technology has to be purposeful and technology should serve as a tool in the frame of solid pedagogical task design (Ang & Wang, 2006).

#### 2.3.4 Concepts and common lines

As it is noted by Fredricks et al. (2004), constructs of engagement often overlap. It is possible to locate similar constructs viewed from different perspectives, which makes it challenging to provide a well-structured classification where each construct would occupy only one individual spot. For example, the need for autonomy can be regarded as one of the basic individual needs (Connell, 1990) or one of the features of authentic work (Newmann et al., 1992). At the same time it can be approached from the teacher's perspective (Skinner & Belmont, 1993; Fredricks et al., 2004). Although the central part of the construct remains the same, different researchers emphasize different aspects of it, which makes it necessary to mention it several times in different sections of the introduced classification.

Nevertheless, the original classification by Fredricks et al. (2004) turned out to be a strong backbone for locating related research studies and identifying key antecedents of student engagement. The review of previous research makes it possible to conclude that there is a great amount of common findings about what and how influences student engagement. Such aspects of classroom environment as interaction with peers and teacher, classroom structure, task characteristics, and students' need for autonomy turned out to be widely recognized by researchers and acknowledged as significant factors shaping student engagement.

## **2.4 Engagement as a multidimensional concept**

The review of previous research demonstrates the complexity of engagement, proving that it is indeed a multidimensional concept. Discussion of engagement often has to go parallel with discussion of interest, emotions, motivation, and self-regulated learning processes, and it is not always possible to establish distinctive causal relationships among these phenomena. In addition, the review of antecedents of engagement, acknowledged in the research literature, illustrates various overlappings in constructs within the concept of engagement itself.

Nevertheless, the complexity of the concept of engagement can be seen as an advantage, since the concept makes it possible to draw a multifaceted framework of students' perceptions of schooling. Such a framework can take into account not only contextual and personal factors on the one side and various emotional, behavioral, and cognitive processes on the other side, but also relations among all of them. Thus, the phenomenon of student engagement is capable of revealing multiple crucial triggers for increasing student learning, which possibly would not be discovered in research on single constructs.

Since growing interest to student engagement and motivation has a practical reason of enhancing learning, it is highly important to be able to extract practical guidelines from these research findings. Some frameworks of strategies, teaching practices, or principles have been discussed in the theoretical part of this thesis. Thus, Gettinger and Walter (2012) provide a framework of teaching practices, Guthrie and Cox (2001) describe a system of effective classroom conditions, Pianta et al. (2012) speak about principles of classroom interaction, and Newmann (1992) discusses indicators of classroom thoughtfulness. In addition to already discussed practical guidelines aimed at enhancing student academic engagement, an outstanding set of instructional design principles can be found in the work by Pintrich (2003). The principles are aimed at supporting student motivation in classroom contexts from a broad perspective embracing various aspects of classroom environment. The design principles go in line with research findings in the field of student engagement discussed in the theoretical part of this thesis. Pintrich (2003) highlights the importance of promoting such task characteristics as interestingness, reasonable level of difficulty (i.e., challenging but achievable), meaningfulness, and utility. The concept of classroom structure is also reflected through the necessity of communicating clear goals, providing

accurate feedback and creating a predictable classroom environment. It is important for the teacher to provide students with autonomy support and create a supportive social relationships in classroom. A classroom mastery goal structure is emphasized in this approach, and evaluation practices are meant to be directed towards an individual student and his or her own progress, rather than comparison with other students (see Pintrich, 2003). All these supports demonstrate that there are multiple aspects to be taken care of by a teacher in order to ensure student engagement in classroom.

### 3 AIM AND RESEARCH QUESTIONS

This study focuses on investigation of influence of classroom environment factors on student engagement during the intervention in the English language classroom in a primary school. The factors and their interplay with individual students' engagement are qualitatively analyzed and described in order to achieve the main aim of the study which is better understand the dynamics of individual students' engagement in a real classroom context. Three major groups of factors are in the center of attention: task characteristics, interactions with a teacher, and interaction with peers. Task characteristics are considered in connection with the use of technology in the classroom, therefore, an important part of discussion is dedicated to contribution of technology in promoting engaging tasks. It is possible to formulate research questions in the following way:

- (1) Did students perceive iPads as increasing the attractiveness of the task, and how did the attractiveness of the task influence engagement?
- (2) Did students perceive iPads as supporting their autonomy within the task, and how did different levels of autonomy influence engagement?
- (3) How did meaningfulness of the task for an individual student influence engagement?
- (4) What were the types of teacher-student interactions affecting engagement, and what effects did they have?
- (5) What strategies did students use to regulate each other's task engagement, and how successful were they?

It is important to notice that in this study I do not aim to analyze different types of engagement (cognitive, behavioral, and emotional). Moreover, I do not intend to analyze engagement on the group level (but only on the individual level). However, these issues are touched upon to some extent.

Engagement in a classroom is emphasized in this study, as opposed to engagement in a larger school community.

## 4 RESEARCH METHODS

### 4.1 Measuring student engagement: common practices and challenges

So far, studies of engagement have been carried out at different levels, from those related to schooling in general to engagement with a specific type of the task (Järvelä & Renninger, 2014, in press). As Fredricks et al. (2004) write, there have been various practices applied for measuring different types of student engagement. Behavioral engagement has been measured with the help of teacher ratings and self-report surveys. They include multiple indicators of conduct, work involvement, and participation, but only few studies have measured all types of behavior. Observation techniques have been also used to evaluate behavioral engagement, for example on-task/off-task analysis technique (see Järvelä, Salonen, & Lepola, 2001; Järvelä, Veermans, & Leinonen, 2008; Määttä et al., 2012). However, the problematic issue here is that observations do not always give sufficient information on the *quality* of effort, participation, and thinking (Fredricks et al., 2004).

Emotional engagement has been measured with the help of self-reports, which include survey items related to emotions about school, school work and people at school. Behavioral and emotional engagement have been often measured in one scale and it has been, therefore, difficult to split them afterwards (Fredricks et al., 2004).

Cognitive engagement is a problematic aspect for measuring, since cognition is not something readily observable. Fredricks et al. (2004) characterize it as a psychological investment in learning. Psychological investment in learning has been measured using goal theory, rating the quality of instructional discourse in classrooms, and self-report questionnaires. Observational techniques have been used to evaluate cognitive engagement in specific subject areas (Fredricks et al., 2004).

Fredricks et al. (2004) note that it is especially difficult to assess cognitive engagement in primary school children. It is challenging and perhaps inappropriate to assess primary school children's strategy use by using questions that require reflection on cognition, because at this age children do not have sufficient metacognitive skills for that purpose. One more problem is that most part of self-report measures do not connect specific strategy use to certain tasks. Therefore, students are to think hypothetically, which

is not easy for young children (Fredricks et al., 2004).

Although most studies have investigated cognitive engagement using such measures as time-on-task and student self-reports, in their study Helme and Clarke (2001) aimed at developing a row of empirical indicators of cognitive engagement. On the basis of the data they got from the study, they suggested that cognitive engagement is observable in classroom conditions and can be recognized with the help of specific linguistic and behavioral indicators.

Fredricks et al. (2004) underline that in addition to specific challenges related to measuring different types of engagement discussed above, there are challenges that concern all the three types. When all the items for measuring different types of engagement are combined into a single, general engagement scale, there is a problem that conceptual distinctions get blurred because similar items are used in order to evaluate different types of engagement. Also, self-report measures do not normally specify subject areas (which could help determine general and content specific tendencies). Moreover, measures do not describe qualitative differences in the level, or degree of engagement (Fredricks et al., 2004).

Fredricks et al. (2004) claim that one more common problem when measuring student engagement is that most part of measures do not say anything about the source of engagement. Measures are not usually attached to specific tasks and situations, therefore, it becomes difficult to claim whether engagement is a function of individual differences or contextual factors. Similar point of view is supported by Järvelä, Salonen, and Lepola (2001) who argue that traditional measuring of motivation can not adequately characterize the dynamics between learner and context. They describe traditional assessment methods used in educational-psychological research as rather static. For example, the trait-type questionnaire, one of the typical motivational assessment methods, can provide an insight into the characteristics of student behavior and is helpful to recognize some patterns in students' motivational beliefs. However, validity and reliability of such questionnaires, especially the ones held in a real classroom setting with young children, have been problematic issues. First of all, there is a risk that a child tends to give socially desirable answers. Secondly, it may be difficult for children to recall and think about their typical behavior. Thirdly, if a child has a tendency to avoid negative issues related to themselves, it may result in biased responses (Järvelä et al., 2001).

However, shifting definitions in the theory of self-regulated learning has led to changing measurement procedures as well (Boekaerts & Corno, 2005). Decontextualized measures of self-regulated learning are now gradually being replaced by domain-specific and context-sensitive measures. Researchers tend to study self-regulated learning processes as dynamic within classroom and other contexts where learning occurs. It has become important to study self-regulation and related learning processes while they are being generated, to capture them in action, “on the fly” (Boekaerts & Corno, 2005).

The growing amount of studies investigating learning processes and instruction in real classroom rather than in laboratory settings has led to understanding that student perceptions, cognitive reactions and actual actions are often related to the context. This becomes a fundamental reason for research on motivation to shift from product-oriented to process-oriented methods, and researchers to acknowledge the significance of context when speaking about motivation (Järvelä et al., 2001).

Thus, Perry and VandeKamp (2000) advocate using observational and semi-structured interview methods in research on student self-regulation and motivation. According to them, these methods help researchers capture young students' attitudes in an authentic context and real time. They argue that by connecting students' actions to specific events in real context it is possible to more accurately reflect on what students actually do rather than what they say they do. In addition, by assessing conformity of students' responses to both rating and open-ended questions it is possible to increase certainty that the questions were understood by students correctly, and that their responses are reasonable. Finally, classroom observations make it possible to establish links between teachers' actions, classroom context, and students' engagement in self-regulated learning. Being able to investigate and analyze what teachers do and say to promote self-regulated learning brings researchers a step closer to understanding of student motivation and classroom learning (Perry & VandeKamp, 2000).

The problem of measuring engagement in technologically-rich learning environments is emphasized by Reading (2008), who notes that claims of engagement in such environments are often based on informal observations rather than reliable measurement. He suggests that whenever a teaching activity is planned in a technological environment, an Engagement Measurement Plan should be included, which would acknowledge the three types of engagement and define at least one indicator for judging



each type of engagement. The challenge is for teachers to find relevant indicators of engagement and such methods of measurement that would be easily applicable in the classroom context (Reading, 2008).

Bulger et al. (2008) introduce a Classroom Behavioral Analysis System for measuring student engagement in computer-equipped classrooms. This is a monitoring software that keeps record of all student computer actions during an instructional episode (e.g., keystroke activities, active applications, and visits to websites). In the end of the session a log file is created that can be then studied and Internet activity can be evaluated with regard of the lesson instruction and activities. This way, a computer offers “a window into the cognitive interplay between student and computer” (Bulger et al., 2008, p. 132).

Analysis of data collected in this empirical study presents an attempt to measure and describe student engagement and its dynamics in a real classroom setting using process-oriented methods.

#### **4.2 Data collection and analysis in this study**

The research team carried out an intervention in a primary teacher training school in Northern Finland. The aim of the intervention was to emphasize and promote certain self-regulation and collaboration skills in students. The research team consisted of five people, each working with a specific aspect. The intervention was carried out during six lessons of the English language in the 4<sup>th</sup> grade, each lesson lasting 45 minutes. The intervention lasted one month. 11 students took part in the research study (4 girls and 7 boys). The students were 10-11 years old (M age = 10,3 years).

There were several reasons for choosing that specific group of students as a sample for this study. To begin with, the students in the group had already been involved in a project aimed at promoting learning through collaboration, technology, and development of self-regulated learning skills. The idea of the intervention carried out for this study went in line with the project. Moreover, it was considered that the experience the students have in working collaboratively and using technology for learning was going to be beneficial during the intervention. In addition, since not all of the members of the research team could speak Finnish, the English language classroom seemed to offer a better opportunity for data collection.

The intervention and actual learning activities were planned by the researchers in

close collaboration with the teacher, and implemented by the teacher. The teacher helped take into account the students' individual features, as well as general characteristics of the group. The teacher was also the one who formed the groups. While the researchers were just present in the classroom and had a role of observers, the teacher remained the main figure for the students during the lessons.

Although it was the English language classroom, a great part of interaction both among students and between students and the teacher happened in Finnish.

The main textbook used in the lessons was "All stars 4. Reader" (Benmergui, Sarisalmi, Alamikkelä, & Peltonen, 2013c). In addition to that, the teacher's book (Benmergui, Sarisalmi, Alamikkelä, & Peltonen, 2013b) and the activity book (Benmergui, Sarisalmi, Alamikkelä, & Peltonen, 2013a) from the same set were used. The central topics of the project were traveling and visiting London, according to the curriculum. At first four lessons there were learning activities that students were required to fulfill using iPads. As it was mentioned before, the children were familiar with using iPad at school, however, it was not a common practice to use them in the English language classroom in particular.

I used several types of data collection tools for my study. First of all, video observations were collected at each lesson. Observations were recorded with the help of three digital video cameras provided by school and one personal digital camera. Students were sitting in three groups (two groups of four students and one group of three), and each group's work was recorded with an individual camera. It is important to notice that although students were sitting in groups, not all the activities were group activities – there were tasks in pairs as well as individual assignments. One additional camera was focused on the teacher.

Derry et al. (2010) suggests that it is fruitful to combine video records with other forms of data in order to guarantee triangulation across sources of data, such as interviews, surveys, field notes, copies of documents used during participants' interactions, and even products created by groups. In my case, learning diaries that were filled out by the students at each lesson are the second source of data. Finally, students' products from one of the activities are used in this study as the third source of data.

Other researchers used other types of data collection tools in addition (e.g., interviews and observation schemes). Common tools were planned by the researchers

together before the intervention took place. After the data were collected, all the outcomes for common use (e.g., video recordings, filled out learning diaries, and students' products) were shared in the research group.

I consider it important to notice that although the data collection for this study was carried out within an intervention project, this study is not aimed at comparing characteristics of student engagement before (or in the beginning) and after (or in the end) the intervention. This study can be best addressed to as a case study since it is aiming at exploring and describing individual engagement in a small sample of students in particular real-life learning context situations.

#### 4.2.1 Video observations

Derry et al. (2010) argue that video offers a possibility of close documentation and observation, as well as makes it possible to carry out analytical, collaborative and archival actions. Video technologies increase the interactional detail that can be captured and stored for further analysis (Derry et al., 2010).

Due to the fact that video observations were taken by several researchers with different research goals, there was not much space for adjusting and planning video recordings in the way that would only fit my particular study. Therefore, video observations were recorded from a general perspective, capturing a great variety of events occurring in each of the groups, and later analyzed from the perspective of my study.

I carried out a detailed analysis of selected video episodes. I chose the episodes where the children were working on learning tasks with iPads. Use of iPads was supposed to increase students' immediate situational interest in the task by making the task more attractive, thus creating a positive background for initiating students' engagement. In addition, use of iPads was expected to support students' autonomy by providing more opportunities for choice within the tasks, as well as increase meaningfulness of one of the tasks by ensuring access to authentic information.

Out of six intervention lessons, first four lessons contained one activity with an iPad each. Thus, 12 video episodes were selected for analysis. The first step before the analysis was transcription of the selected video episodes. The translation from Finnish to English was done simultaneously with the transcription process. The final outcome was 12 transcripts in the English language. The translation was carried out with the help of a

native Finnish speaker.

The chosen video episodes became a central source for describing individual students' engagement. Gettinger and Walter (2012) suggest that engaged time is the proportion of instructional time when a student is cognitively and behaviorally engaged in learning. It can be judged by such indicators as paying attention, completing work, listening, and participating in relevant discussions. It is important to note that engaged time concerns both active responding and passive attending. Time on-task, in its turn, is engaged time on particular learning assignments. Time on-task reflects engaged time spent on targeted activities that have specific learning goals (Gettinger & Walter, 2012).

Describing a learning situation using duration of on-task and off-task episodes is the most basic observational method that helps evaluate motivational characteristics of a learning activity (Järvelä et al., 2001; Järvelä, Veermans, et al., 2008). "On-task episode' is the phenomenon that implies student approaching a task by "attending to the task or presenting task-focused non-verbal signs" (Järvelä Veermans, et al., 2008, p. 306). "Off-task episode' means avoidance of a learning activity, such as "turning away, approaching other students for telling jokes or other substitute activities instead of learning" (Järvelä, Veermans, et al., 2008, p. 306). In general, on-task activities are characterized by attending to instructions and concentration on concrete on-task work. On-task behavior involves such cognitive activities as abstract thinking in the problem solving process, joint problem solving in social interaction, thinking aloud or presenting higher order planning. Off-task behavior may include such type of activities as escaping behavior, that is, indication of psychological distance toward the task, and substitute activities (Järvelä, 1998).

My method proceeded as follows: first, I watched selected classroom video recordings of certain learning activities and made first general evaluation of individual students' on-task/off-task behavior. Basic video software was used (DAPlayer). I adopted the abductive approach in order to locate relevant factors of classroom environment that had an impact on the dynamics of student engagement and which I could evaluate with the data I had. According to Dubois and Gadde (2002), a researcher can better understand both theory and empirical phenomena by constantly going back and forth between them. They claim that "theory cannot be understood without empirical observation and vice versa" (Dubois & Gadde, 2002, p. 555). Thus, systematic combining, or abductive approach, implies efforts to match theory and reality. It is important to note that data were not forced

to suit already existing theory. On the contrary, theoretical framework was developed and deepened simultaneously with data analysis in order to improve understanding of the phenomenon thus making developing own categories possible. Thus, abductive approach provided an opportunity to take advantage not only of the empirical material, but of theoretical models as well (Dubois & Gadde, 2002). Therefore, while watching the video I simultaneously went through the detailed transcription, highlighted relevant pieces of text, marked the teacher's involvement into students' activity, and took notes about relevant events in the classroom environment that seemed to affect individual students' engagement.

Second, I watched the video over again, paying attention to one individual student in a group at a time. I drew a timeline and divided a sequence of each student's behavior into on-task and off-task episodes, one unit of behavior being 10 seconds. Relevant software (NVivo) was considered and tested, however, I found more convenient to carry out the analysis using the paper-and-pen method. The coding for on-task and off-task behavior was first of all based on previous studies. A learning period was marked as task-oriented, for example, if a student was concentrating on the task in a way that external disturbing did not interfere with his or her task engagement (Järvelä, Veermans, et al., 2008; Järvelä et al., 2001), and if a student's verbal and/or non-verbal behavior showed task-involvement and desire to stay in a problem solving situation (Järvelä et al., 2001). A period was marked as non-task-oriented if a student showed unwillingness toward the task, imitated or performed superficial activities, indicated helplessness (Järvelä, Veermans, et al., 2008; Järvelä et al., 2001). In addition to the general guidelines for on-task/off-task coding, I formulated additional study-specific principles based on the video observations and own understanding of the issue in order to guide my coding process (see Table 1).

Table 1. Additional study-specific guidelines for on-task/off-task coding

<b>On-task</b>
A student is asking task-related questions from the teacher, indicating involvement in the activity and readiness to begin.
A student is regulating group's behavior according to the task instructions.
A student is indicating involvement and willingness to work on the task by non-verbal means (e.g., leaning towards the iPad and revising instructions from the blackboard or textbook).
A student is providing task-related explanation or technological help to a peer.
<b>Off-task</b>
A student is indicating loss of focus on the task by non-verbal behaviors (e.g., staring into the air and looking bored).
A student is demonstrating disruptive behavior.
A student is playing a game on the iPad.
A student is discussing non-task-related issues with peers.

If a student's behavior was not possible to code as on-task or off-task (e.g., if it was not possible to see what a student is currently doing with an iPad, or if it was not possible to see the student for a moment in the recording at all), the 10-seconds period was marked as 0-orientation. However, if there were some other signals indicating that the student is on-task or off-task, it was coded accordingly (e.g., the iPad is not seen but it is clear that the student is playing a game from the conversation with a peer).

As a third step of the analysis process, I counted the proportion of time spent on-task and off-task for each student. The level of disorganization of a task-oriented activity would be directly proportional to the approximate amount of time spent off-task (Järvelä et al., 2001). However, as Järvelä et al. (2001) note, total times spent on-task and off-task do not necessarily correctly characterize the grade of coherence/incoherence of the activity and intensity of task engagement. For example, it is possible that a chain of activities starts with a long-lasting period of non-task-oriented behavior, which could take up to 50% of total performance time, but then the student may gain task control and engage in a long coherent task-oriented period (the other 50% of total performance time). Therefore, despite of the first unsuccessful part of performance, the other part can be rather successful and highly organized. On the other hand, it can be that while performing a task a student is constantly shifting from on-task to off-task behavior. Although the distribution would be the same (approximately 50% and 50%), the quality of coherence would be totally different – and it would indicate disorganization (Järvelä et al., 2001).

Therefore, there is a need to use another, more accurate, observational method in order to evaluate the coherence of the activity. This method, called phase-shift analysis, determines the amount of shifts from on-task to off-task behaviors and vice versa. A measure of incoherence would be as following: frequency of shifts/total time of performance (Järvelä et al., 2001). Järvelä, Veermans, and Leinonen (2008) note that “the fluctuations and the grade of disorganization vs. coherence of activity tell more about the dynamics of engagement” (p. 306). Frequent on-task/off-task transitions would indicate that it is challenging for a student to stay engaged in a task, while long-lasting on-task sequences would report a student’s high level of engagement (Järvelä et al., 2001). Therefore, my fourth stage in data analysis was counting and documenting the amount of shifts from on-task to off-task behaviors for each individual student. Shifts from and to 0-orientation were not counted.

In this manner, the 12 selected video episodes were analyzed. After the calculations were completed, they were summed up in tables. However, the activity on Lesson 3 was not brought to further analysis because video data for this activity in Group 3 was not sufficient (only about three minutes were recorded), and not all the students from the remaining two groups were captured properly in the recording. Therefore, only four out of 11 students were analyzed in this activity, which would make the discussion of student engagement across the class during this activity less valid. Moreover, the second part of this activity in Group 2 could not be analyzed due to poor recording. Therefore, nine learning situations are discussed in this study.

The analyzed activities on Lessons 1 and 4 were divided into two parts, because students were asked to fill out the learning diary in the middle of each of these two activities. The on-task/off-task analysis was carried out separately for the two parts in order to evaluate students' willingness and effort to restore engagement and come back to the task after the learning diaries.

The activity on Lesson 1 was a group activity. I started and ended the analysis at the same time point for all the students in the group. The analysis started when at least one of the students made a task-related action, and ended when each of the students in the group stopped doing the task and started the next activity. That concerns both parts of the activity. The activity on Lesson 2 was in a pair/group. The same principle for selecting starting and ending points for analysis was applied. The activity on that lesson was not splitted by the

learning diaries. The activity on Lesson 4 was mainly individual. Therefore, the analysis started individually for each of the students when the first task-oriented action was made, and ended individually for different students when a student started the next activity. That concerns both parts of the activity.

#### 4.2.2 Description of the analyzed learning activities

Three learning situations are analyzed in this study. In the analyzed activity on Lesson 1 students were asked to work in groups. As a group, they got one iPad and were given a task to play pictictionary using the new vocabulary (traveling items). One student was supposed to be drawing while others would be trying to guess the item and name it in English. The one who got it right could draw the next item.

On Lesson 2 students were sitting at the desks in the same groups that they were on the first lesson. However, the activity that was analyzed from this lesson was done by students in pairs. Before the lesson, the research group prepared an interactive map of Europe with 10 cities marked on it. All the pictures used for creation of the exercise were licensed under Creative Commons. The students, working in pairs, were supposed to ask each other about how they could travel from Oulu to different cities and how much it would cost (by clicking a specific city there were transportation options to choose from and their prices popping up).

The task on Lesson 4 was individual for each student, even though students were still sitting in groups. Each student got an iPad. The task was to make a popplet (using the “Popplet” application) about one of three topics: places related to traveling, places related to fun and free time, and places related to sports. Students were to use new English vocabulary, and they could add pictures to their popplets as well. After preparing individual popplets, students were asked to present them in their groups.

In all of the analyzed activities the teacher provided detailed instructions on how to proceed with the task, as well as created a model and displayed it on the smartboard.

#### 4.2.3 Learning diaries

At each of the six intervention lessons students were asked to fill out a learning diary. Learning diary included nine statements that students were to evaluate based on the 5-point Likert-type scale, varying from “strongly disagree” to “strongly agree”. Children were asked to evaluate learning diary statements with regard to the current lesson. Learning



diaries were given to students normally in the middle of a certain activity in order to better capture their cognitive and emotional perceptions. Learning diaries were given to students in Finnish.

Three statements in the diary were related to individual work, three statements – to the use of technology, and three statements – to collaboration. Two statements are of a particular interest for this study and give some insight about how students perceived level of choice (statement 5) and attractiveness, or fun part (statement 6) of the task on a particular lesson:

5. With an iPad I can choose my own way to work which I prefer.
6. Using an iPad makes tasks more fun.

Although all statements were considered, only two statements were selected for further qualitative analysis and support of the video data. The main reason for that is that the questions in the learning diaries were related to the lesson as a whole, except for three questions about use of iPads (because there was only one activity on each of the first four lessons that involved an iPad). Therefore, it would make the results less credible if the answers about activities during the whole lesson would be used to analyze students' perceptions of only one specific activity. One of the three statements about using an iPad was excluded from further analysis since it was found irrelevant in the frame of refined research questions.

#### 4.2.4 Group products

Individual products from the learning activity on Lesson 4 were used during the data analysis. Individual products were not analyzed as such; in this study they were used only as an additional data source in order to demonstrate certain characteristics of student engagement and complement findings from the video data.

#### 4.2.5 Classroom factors affecting student engagement: Qualitative analysis

In this study I use process-oriented approach to data analysis, which is best described through the concept of dynamic assessment. According to Järvelä et al. (2001), dynamic motivational assessment implies concentrating on the actual process and evaluating how a student's motivational features vary and change during the continuous sequence of learning

episodes. Dynamic assessment, therefore, focuses on person-environment interactions and takes into account individual differences related to progressive changes. In this kind of assessment, the interaction of a student with his or her environment is the center of evaluation. The main point is to capture the changes of an individual's motivation in connection to the contextual changes, such as, different periods of classroom activity. During dynamic assessment such issues as a student's reactions to task difficulty, time pressure factors, obstacles and social feedback are taken into account (Järvelä et al., 2001).

Influence of classroom context factors on individual students' engagement is in the center of attention in this work. Qualitative approach is adopted in this study as the main aim is to describe and understand phenomena under investigation. The results of on-task/off-task and phase-shift analysis serve as a main descriptor of individual students' engagement, and they are being qualitatively interpreted from the point of view of specific classroom factors reflected in Table 2. Characteristics of the analyzed learning activities, video data, responses obtained from the learning diaries, as well as students' products are being qualitatively analyzed in order to understand the dynamics of student engagement and establish reasons of the changes in individual students' engagement.

Table 2. Classroom context factors analyzed in the study

Factor	Brief description	Available data
Attractiveness of the task (related to the use of iPads)	Did use of iPads make the task more fun and entertaining?	Learning diaries: statement 6; Video observations – descriptive analysis of students' behavior
Autonomy support	Opportunity for students to make choices, flexibility in work procedures; contribution of iPads to autonomy support	Defined by the given task (qualitative description); Learning diaries: statement 5; Video observations – descriptive analysis of students' behavior
Meaningfulness of the task	How much students could relate the task to own personal experiences? Contribution of iPads to meaningfulness of the task	Defined by the given task (qualitative description); Video observations – descriptive analysis of students' behavior; Students' products from the learning activity on Lesson 4
Interactions with the teacher	Level of academic and social assistance from the teacher	Video observations: the frequency and quality of the teacher's interference (additional instructions, regulation of behavior, and assistance) – descriptive analysis
Peer regulation	Strategies used to regulate each other's engagement	Video observations: the frequency and quality of verbal statements aimed at regulation of peer's work and task engagement – descriptive analysis

## 5 RESULTS

### 5.1 Assessing quantity and quality of student engagement

On-task/off-task and phase-shift analysis turned out to be a solid approach for measuring individual students' engagement during learning activities in the classroom from the point of view of quantity and coherence of engagement.

The results of the analysis indicate that individual students' engagement varying across the three analyzed activities was a common phenomenon. For example, Terhi's engagement was higher during the activities on Lessons 2 and 4 than Lesson 1, as her time on-task on Lessons 2 and 4 reached 100%.

Not only the amount of time spent on-task and off-task, but also the amount of shifts from on-task to on-task turned out to be highly significant for measuring engagement. For example, Ville's engagement on Lesson 1 (before filling out the learning diary) can be compared to Petri's engagement on Lesson 1 (after filling out the learning diary). Although the amount of on-task and off-task time was approximately equal for both boys (around 50%) in these learning situations, Ville's activity was more disorganized, as the amount of on-task/off-task shifts was significantly higher.

Moreover, the results of on-task/off-task and phase-shift analysis make it possible to conclude that some of the students demonstrated higher levels of quite stable engagement in general throughout the three analyzed activities, while other students' engagement was less stable in terms of both quantity and coherence.

The results of on-task/off-task and phase-shift analysis for individual students' engagement across the three analyzed activities are presented in three tables (see Tables 3-5 – one table per group). “Part 1” in the tables indicates the part of the task before filling out the learning diary, and “Part 2” – after filling out the learning diary. For each of the students in each of the analyzed learning activities total time of the activity is documented, after which time on-task, off-task and 0-orientation time are presented in minutes and percents. Finally, the amount of shifts during the activity is presented. In case an individual student's activity was not analyzed on a particular lesson, the reason is clarified in the table.

Table 3. Results of on-task/off-task and phase-shift analysis for Group 1

Note: “Total” – total time spent on the learning activity, “On” – time spent on-task, “Off” – time spent off-task, “0” – 0-orientation time, “f” – amount of on-task/off-task shifts

	Lesson 1		Lesson 2	Lesson 4	
	Part 1	Part 2		Part 1	Part 2
<b>Terhi</b>	<b>Total:</b> 7,7 min <b>On:</b> 5,3 min (68,8%) <b>Off:</b> 1,7 min (22,1%) <b>0:</b> 0,7 min (9,1%) <b>f</b> 8	<b>Total:</b> 2,7 min <b>On:</b> 1,35 min (50%) <b>Off:</b> 1,35 min (50%) <b>f</b> 3	<b>Total:</b> 6 min <b>On:</b> 6 min (100%) <b>f</b> 0	<b>Total:</b> 6,8 min <b>On:</b> 6,8 min (100%) <b>f</b> 0	<b>Total:</b> 7,2 min <b>On:</b> 7,2 min (100%) <b>f</b> 0
<b>Ville</b>	<b>Total:</b> 7,7 min <b>On:</b> 3,7 min (48,05%) <b>Off:</b> 3,8 min (49,35%) <b>0:</b> 0,2 min (2,6%) <b>f</b> 17	<b>Total:</b> 2,7 min <b>On:</b> 0,85 min (31,5%) <b>Off:</b> 1,85 min (68,5%) <b>f</b> 2	<i>Student was absent</i>	<b>Total:</b> 6,5 min <b>On:</b> 6 min (92,3%) <b>Off:</b> 0,5 min (7,7%) <b>f</b> 2	<b>Total:</b> 4,7 min <b>On:</b> 3,5 min (74,5%) <b>Off:</b> 0,7 min (14,9%) <b>0:</b> 0,5 min (10,6%) <b>f</b> 2
<b>Aleksi</b>	<b>Total:</b> 7,7 min <b>On:</b> 3,2 min (41,6%) <b>Off:</b> 4,5 min (58,4%) <b>f</b> 11	<b>Total:</b> 2,7 min <b>On:</b> 0,7 min (25,9%) <b>Off:</b> 2 min (74,1%) <b>f</b> 2	<b>Total:</b> 6 min <b>On:</b> 6 min (100%) <b>f</b> 0	<b>Total:</b> 7,3 min <b>On:</b> 7 min (95,9%) <b>Off:</b> 0,3 min (4,1%) <b>f</b> 2	<b>Total:</b> 3,3 min <b>On:</b> 3,3 min (100%) <b>f</b> 0
<b>Jussi</b>	<b>Total:</b> 7,7 min <b>On:</b> 1,8 min (23,4%) <b>Off:</b> 5,7 min (74%) <b>0:</b> 0,2 min (2,6%) <b>f</b> 13	<b>Total:</b> 2,7 min <b>On:</b> 1,5 min (55,6%) <b>Off:</b> 1,2 min (44,4%) <b>f</b> 1	<i>Student was not seen in the video recording properly</i>	<b>Total:</b> 5,5 min <b>On:</b> 3,5 min (63,6%) <b>Off:</b> 2 min (36,4%) <b>f</b> 4	<b>Total:</b> 2,7 min <b>On:</b> 1 min (37%) <b>Off:</b> 1,7 min (63%) <b>f</b> 2

The results of on-task/off-task and phase-shift analysis are used in this study as a main descriptor of individual students' engagement throughout the three analyzed activities.

Table 4. Results of on-task/off-task and phase-shift analysis for Group 2

Note: “Total” – total time spent on the learning activity, “On” – time spent on-task, “Off” – time spent off-task, “0” – 0-orientation time, “f” – amount of on-task/off-task shifts

	Lesson 1		Lesson 2	Lesson 4	
	Part 1	Part 2		Part 1	Part 2
<b>Anna</b>	<b>Total:</b> 6,8 min <b>On:</b> 2,5 min (36,765%) <b>Off:</b> 3,5 min (51,47%) <b>0:</b> 0,8 min (11,765%) <i>f</i> 7	<b>Total:</b> 2,7 min <b>On:</b> 0,2 min (7,4%) <b>Off:</b> 2,5 min (92,6%) <i>f</i> 2	<b>Total:</b> 6 min <b>On:</b> 4,8 min (80%) <b>Off:</b> 1,2 min (20%) <i>f</i> 2	<b>Total:</b> 4,8 min <b>On:</b> 4,8 min (100%) <i>f</i> 0	<b>Total:</b> 9,2 min <b>On:</b> 9,2 min (100%) <i>f</i> 0
<b>Antti</b>	<b>Total:</b> 6,8 min <b>On:</b> 3,8 min (55,9%) <b>Off:</b> 3 min (44,1%) <i>f</i> 8	<b>Total:</b> 2,7 min <b>On:</b> 0,2 min (7,4%) <b>Off:</b> 2,5 min (92,6%) <i>f</i> 2	<b>Total:</b> 6 min <b>On:</b> 4,5 min (75%) <b>Off:</b> 1,5 min (25%) <i>f</i> 1	<b>Total:</b> 3,2 min <b>On:</b> 2,5 min (78,1%) <b>Off:</b> 0,7 min (21,9%) <i>f</i> 4	<b>Total:</b> 5 min <b>On:</b> 4,3 min (86%) <b>Off:</b> 0,5 min (10%) <b>0:</b> 0,2 min (4%) <i>f</i> 1
<b>Oskari</b>	<b>Total:</b> 6,8 min <b>On:</b> 4 min (58,8%) <b>Off:</b> 2 min (29,4%) <b>0:</b> 0,8 min (11,8%) <i>f</i> 5	<b>Total:</b> 2,7 min <b>Off:</b> 2,7 min (100%) <i>f</i> 0	<i>Student was in a different group</i>	<i>Student was not seen in the video recording properly</i>	<i>Student was not seen in the video recording properly</i>

Although the results of on-task/off task analysis provide information about the quantity of student engagement, and phase-shift analysis gives a picture about the quality of engagement in terms of coherence of the activity, it is still not clear whether, for example, engagement was deep or superficial, self-initiated or restored by the teacher, and whether it was followed by positive or negative emotions. In addition, the results of on-task/off-task and phase-shift analysis only do not provide information about reasons that caused engagement or disengagement.

The following sections (5.1.1-5.1.5) bring light to these issues as I discuss the influence of each of the classroom factors introduced in Table 2 on individual students' engagement and its dynamics. I seek to identify the sources, or specific factors from classroom environment, that changed and shaped engagement. The most illustrative episodes are discussed in closer detail. In addition, I touch upon such issues as quality and type of student engagement, and make assumptions about these aspects when possible.

Table 5. Results of on-task/off-task and phase-shift analysis for Group 3

Note: “Total” – total time spent on the learning activity, “On” – time spent on-task, “Off” – time spent off-task, “0” – 0-orientation time, “f” – amount of on-task/off-task shifts

	Lesson 1		Lesson 2	Lesson 4	
	Part 1	Part 2		Part 1	Part 2
<b>Elna</b>	<b>Total:</b> 6 min <b>On:</b> 5,5 min (91,7%) <b>Off:</b> 0,5 min (8,3%) <i>f</i> 3	<b>Total:</b> 2,5 min <b>On:</b> 2,5 min (100%) <i>f</i> 0	<b>Total:</b> 5 min <b>On:</b> 4,3 min (86%) <b>Off:</b> 0,7 min (14%) <i>f</i> 2	<b>Total:</b> 5,7 min <b>On:</b> 5,7 min (100%) <i>f</i> 0	<b>Total:</b> 4,5 min <b>On:</b> 3,7 min (82,2%) <b>Off:</b> 0,3 min (6,7%) <b>0:</b> 0,5 min (11,1%) <i>f</i> 2
<b>Petri</b>	<b>Total:</b> 6 min <b>On:</b> 5,3 min (88,3%) <b>Off:</b> 0,7 min (11,7%) <i>f</i> 3	<b>Total:</b> 2,5 min <b>On:</b> 1,3 min (52%) <b>Off:</b> 1,2 min (48%) <i>f</i> 1	<b>Total:</b> 5 min <b>Off:</b> 5 min (100%) <i>f</i> 0	<i>Student was not seen in the video recording properly</i>	<i>Student was not seen in the video recording properly</i>
<b>Laura</b>	<b>Total:</b> 6 min <b>On:</b> 5,7 min (95%) <b>Off:</b> 0,3 min (5%) <i>f</i> 1	<b>Total:</b> 2,5 min <b>On:</b> 1 min (40%) <b>Off:</b> 1,5 min (60%) <i>f</i> 3	<b>Total:</b> 5 min <b>On:</b> 4,3 min (86%) <b>Off:</b> 0,7 min (14%) <i>f</i> 2	<b>Total:</b> 5,8 min <b>On:</b> 5,8 min (100%) <i>f</i> 0	<b>Total:</b> 5 min <b>On:</b> 4,2 min (84%) <b>Off:</b> 0,3 min (6%) <b>0:</b> 0,5 min (10%) <i>f</i> 2
<b>Joni</b>	<b>Total:</b> 6 min <b>On:</b> 5,3 min (88,3%) <b>Off:</b> 0,7 min (11,7%) <i>f</i> 3	<b>Total:</b> 2,5 min <b>On:</b> 2,3 min (92%) <b>Off:</b> 0,2 min (8%) <i>f</i> 2	<i>Student was given an individual task</i>	<i>Student was not seen in the video recording properly</i>	<i>Student was not seen in the video recording properly</i>

### 5.1.1 Attractiveness of the task

As it was expected, most part of the children considered that use of iPads made learning tasks more fun (see Table 6). As it was observed from the video recordings, generally the students were eager to begin the task with the use of an iPad. Therefore, during these activities there was a positive catalyst for engagement, a contextual trigger that caused positive emotions about the task and immediate situational interest. From the observations it was possible to see that attractiveness of the task influenced behavioral engagement. For example, during the activity on Lesson 1 children were eager to take their turn in drawing:

*Antti: I will take this, I will take this...*

*Aleksi: Hey, hey, hey, look who is drawing first, yeah, I will draw first!*

Jussi: *Then me, then me, Alekski, give it to me after that.*

However, it is important to mention that in some cases iPads were distracting for some of the students. The main problem was individual children's wish to play a game instead of doing the task. It could be observed that the first thing some of the students did after taking an iPad was starting to play a game. In such cases, the teacher had to tell a student individually that the student had to shut the game down and start doing the task. It could also happen that an individual student fulfilled the task quickly and started to play a game. It is possible to assume that the tasks in these cases were not meaningful enough for individual students to trigger their interest and engagement, or not challenging enough to maintain them. For example, Ville and Alekski stayed engaged in the activity on Lesson 4 until they completed the task and were satisfied with the end result. Having done that, however, they started to play their favorite game. During the same activity, Antti was playing a game on his iPad as well, and he started working on the task only when the teacher approached and helped him individually.

Antti was the only student who assigned low ranking to the contribution of iPads to the fun part of the task throughout the three analyzed activities (see Table 6). His answers in the learning diary are different from the general pattern. The quality of his engagement is described in the following sections in relation to other classroom factors.

*Table 6.* Students' perceptions of contribution of iPads to the entertaining part of the task

*Note:* The data are absent in case the student's activity was not analyzed during on-task/off task and phase-shift analysis

Name	Lesson 1	Lesson 2	Lesson 4
Terhi	4	5	5
Ville	5	-	5
Alekski	4	5	4
Jussi	1	-	5
Anna	4	4	4
Antti	1	3	1
Oskari	5	-	-
Elina	4	4	2
Petri	4	5	-
Laura	5	5	5
Joni	5	-	-

### 5.1.2 Autonomy support in the task

The analyzed learning activities varied in the level of choice that students were able to make and within the task. While the task on Lesson 2 supported autonomy quite little (there was a limited amount of destinations as well as means of transport to choose from), the activity on Lesson 1 provided more choice (students could choose which drawing application to use and how themselves). The task on Lesson 4 was the one which supported autonomy most of all – the only requirement was to use certain application and complete the task according to the general theme, but students were free to choose what contents to include, how to organize them, how to decorate the popplet, and what pictures to add.

iPad was expected to increase student autonomy within the selected tasks by enhancing choice and flexibility in work procedures. However, students had different perceptions of an iPad being a tool that allowed them choose own way of working (see Table 7). In case of some students rankings corresponded to the changes in their intensity of engagement. For example, Ville showed lower engagement on Lesson 1 than on Lesson 4 where he ranked the statement with 4 and 5 correspondingly. The same can be said about Jussi, Elina, and Petri. At the same time rankings by Terhi, Antti, and Laura showed the opposite: they ranked the statement with a lower number while their engagement during the corresponding activity was actually higher. Aleksii's ranking stayed the same throughout the lessons, in spite of the changes in the intensity of his engagement. Therefore, it can be concluded that it was difficult for students to perceive the level of choice provided by the iPads in particular tasks.

These results can be explained by the fact that there was only one relatively short activity at each of the analyzed lessons that required use of an iPad, which could have made it difficult for students to evaluate the degree of choice provided in one specific task and the contribution of iPads to that. It has to be noted as well that students' autonomy in the analyzed tasks was not explicitly emphasized in the teacher's instructions either. Taking initiative in making choices was not specifically encouraged, as the teacher mainly relied on detailed step-by-step instructions. For example, during the activity at Lesson 4, the teacher emphasized that first students should write words, and *having done that* they can look for the pictures.



Table 7. Students' perceptions of contribution of iPads to autonomy support in the task

Note: The data are absent in case the student's activity was not analyzed during on-task/off task and phase-shift analysis

Name	Lesson 1	Lesson 2	Lesson 4
Terhi	4	3	3
Ville	4	-	5
Aleksi	4	4	4
Jussi	1	-	4
Anna	4	4	4
Antti	3	2	2
Oskari	5	-	-
Elina	4	2	4
Petri	4	3	-
Laura	4	-	3
Joni	2	-	-

It could be observed that many students were eager to make own choices, however, they were not always sure if they could do it and if it was going to be the right thing. Therefore, they asked for the directions from the teacher. The task at lesson 4, being most open-ended, caused most amount of such questions:

Lesson 1:

Terhi (asking the teacher): *With what program?*

Teacher: *You can choose yourself with what program.*

Lesson 4:

Joni (asking the teacher): *How many do I need to write?*

Teacher: *As many as you find connected to your topic.*

Lesson 4:

Terhi (asking the teacher): *Can I write to the fun part, for example, sports?*

Teacher: *Yes.*

### 5.1.3 Meaningfulness of the task

The three analyzed learning activities also differed in the degree to which students could relate them to the real world and their individual experiences. The first analyzed task did not have any significant connection to students' personal experiences. The task on Lesson 2 had higher level of relatedness to the real world since it included real European and Scandinavian cities, as well as realistic prices and actual means of transport. Some of the students managed to find relevant connections, relate to them and demonstrate them. For example, Anna said while doing the activity: *“Stockholm is my favorite place in Sweden”*.

The task on Lesson 4 was supposed to be the one where students could express own experiences and impressions, thus, having highest degree of meaningfulness. In addition, iPads provided an opportunity for students to use authentic data (e.g., pictures of real places) in their works. Having discussed other task characteristics previously, I consider it important to highlight at this point that during the activity on Lesson 4 engagement was of the highest quality throughout the class. As it can be seen from Tables 3-5, not only the amount of on-task behavior was higher, but, what is most noteworthy here, the amount of shifts from on-task to off-task behavior was smaller. Therefore, the activity on Lesson 4 turned out to be the most coherent and organized for the most students. I believe that higher levels of both autonomy support and task meaningfulness were significant factors that supported engagement during this activity. It could be useful to bring for closer analysis cases of individual students to consider engagement especially from the point of view of task meaningfulness:

**Example 1: Aleksi.** Although it took a little while for Aleksi to concentrate on the task in the beginning, in a short period of time he started doing the task and kept his engagement on a high level. When the teacher asked to fill out the learning diaries, it took quite a long time (about 2,5 minutes) for Aleksi to switch from the task to the diary. After the diary he went back to the task again, finalized it, and only after presenting the results to the peers he started to play the game.

It was interesting to observe that Aleksi connected the contents of his popplet to the real world around him and his particular interests (see Figure 2). For example, he mentioned Hintta, which is an area in Oulu with a skate park.

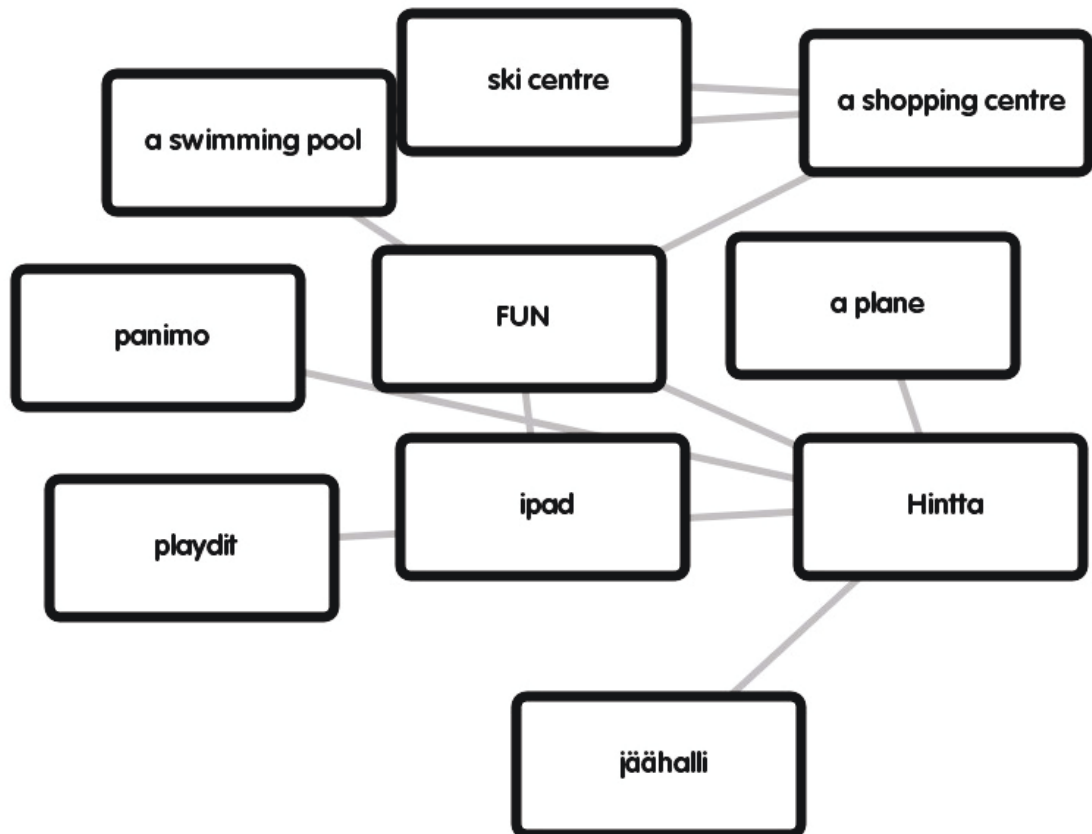


Figure 2. Aleksii's popplet.

**Example 2: Anna.** Right after getting the instructions, Anna started to work on the task. She kept engaged throughout the whole task, stayed focused and concentrated. Even when she had to take a break and fill out the diaries, she did that focused, and returned to the popplet at once. In the end of the task the teacher asked students to send the popplet to researchers. After the teacher gave instructions how to do that, Anna still kept finalizing her popplet for a long time before sending (while, for example, Antti was playing on his iPad next to her). The end product made it possible to see that Anna connected contents of her popplet to Oulu and reflected her favorite places in Oulu, which also demonstrates her personal contribution to the interpretation of the task. For example, she mentioned Ainola park and traffic park for children in Oulu, as well as added real pictures of them that she found on the Internet.

**Example 3: Terhi.** Right after the teacher provided the instructions, Terhi started asking task-related questions actively – she was at once excited about working on the task. With her questions Terhi demonstrated her thinking and planning the task completion. When the teacher asked the children to put iPads away for a while and fill out the learning diaries, Terhi did not stop doing the task at once. She still continued for a while, and only in some time she took the learning diary. When Terhi finished the diary, she was eager to continue with the popplet: she tried not to spend too much time on the learning diary. And even after presenting her popplet to the rest of the group, she still stayed on-task and kept finalizing her work (while, for example, Alekski and Ville started playing a game).

It is also important to mention that the task on Lesson 4, being both open-ended and relevant to students' personal experiences, thus providing freedom for students to create unique individual end products, seemed to ensure a good opportunity to work towards learning of content (i.e., new vocabulary). It was possible to observe because children were asking a lot of content-oriented questions from the teacher, indicating high levels of cognitive activity:

Ville: *What is “uimahalli”?*

Teacher: *“Uimahalli”? What was it here (showing to the book)? It's in this your page here.*

Ville: *Is it?*

Teacher: *It is. So which one of these was it?*

Ville: *Swimming pool...*

Anna: *What is “liikennepuisto” in English?*

Teacher: *“Liikennepuisto”? Traffic park.*

Elina: *What is, Katri, what is “park street” and “church street”?*

Teacher: *Park street? What is “park”? “Puisto”. And what is “church”? “Kirkko”.*

#### 5.1.4 Students' interactions with the teacher

Interactions with the teacher turned out to be one of the key factors affecting engagement in this classroom during the intervention. I classified interactions with the teacher that had direct influence on student engagement into three groups: provision of additional instructions (e.g., answering students' questions about the task), regulation of students' behavior (e.g., telling individual students off), and intensive assistance of an individual student or a pair (i.e., fulfilling a task with students step by step). However, different types of interference had different effects from case to case. In this section I describe briefly the role of teacher's interference in demonstrative situations throughout the four lessons.

In case of Group 1 at the activity on Lesson 1 the teacher was both providing additional instructions and regulating students' behavior. Regulation of behavior was the prevailing type of interference. As it can be seen from Table 3, the activity of the group was highly disorganized (especially during the first part of the task), as the amount of on-task/off-task shifts was quite large. During this part of the lesson the teacher had to mainly regulate Aleks'i's behavior:

Teacher: *So, Aleks'i, if you don't know how to do it then there's someone else who can do it.*

Teacher: *So, Aleks'i, now it should be that everyone can see.*

Teacher: *Hey, Aleks'i, take your seat, please.*

Teacher: *Aleks'i, please, put the iPad under the desk.*

In this case the teacher's interference was not quite successful. Even when she took an iPad from Aleks'i and gave it to Terhi, and the activity of the group concentrated more around the task, the activity still stayed quite disorganized in general. Although the teacher managed to regulate the activity in the group partly, she still had to repeat the same thing to Aleks'i every few minutes. Her regulation worked only for short periods of time.

The activity during the second part of the task on Lesson 1 (see Figure 3) is an example of successful regulation of the group's behavior by the teacher. After the diaries

were completed, the group could not restore their engagement and continue with the pictorial task. When the teacher approached the group and regulated their behavior the children re-engaged in the task very fast. However, their engagement was initiated due to the teacher only. Thus, the group did not seem to be focused on the task deeply, as they continued joking and were doing the task just formally. In addition, in about a minute Alekski and Ville lost their engagement at all. Thus, the assumption can be made that these students demonstrated only behavioral engagement in this case, and not necessarily cognitive, as the quality of engagement was quite low.

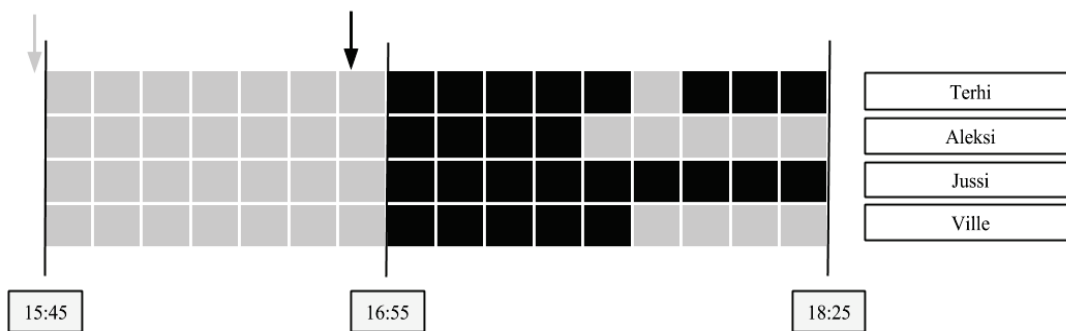


Figure 3. Individual on-task/off-task time, Group 1, Lesson 1, Part 2.

Note: Grey – off-task, black – on-task, grey arrow – additional instruction from the teacher, black arrow – regulation of behavior by the teacher.

During the activity on Lesson 4 the teacher provided mainly additional instructions throughout the whole activity, and not that much behavioral regulation to Group 1. The teacher had to regulate Alekski's actions only once, when he wanted to play his favorite game in the middle of the task (after filling out the learning diary). Her regulation was successful and Alekski re-engaged in the task. The teacher also tried to prevent Jussi from playing the game and make him return to the task again. However, that attempt to regulate his behavior took place when he had already been off-task for quite a long while, and he did not re-engage anymore in this task.

Additional instruction turned out to be the highest quality type of teacher support during these observations. In these cases, the teacher's interference did not mean to restore engagement. When the teacher provided answers to students specific questions about the task and gave additional instructions, she supported and enhanced original engagement.

The activity of Group 1 during Lesson 4 can be a good illustration:

Ville: *What is the headline?*

Terhi (asking the teacher): *What is the headline?*

Teacher: *You have to return this work (to the researchers), so do it carefully.*

Aleksi: *Nothing... aa, fun!*

Teacher: *Places that are connected with having fun.*

Aleksi: *Ahaa!*

Teacher: *So, look there your own theme: was it about sport places, or was it about places connected with traveling.*

There were interesting examples from the activity in Group 2 as well. In case of this group working on the task on Lesson 1, Antti expressed unwillingness to work on the task. The teacher had to approach the group many times and repeat task instructions. In this case her additional instructions were close to assisting the student. However, the teacher was still trying to prompt Antti's thinking and action by asking leading questions and letting him take control of the task himself. This turned out to be partly successful as Antti attained to the task during some period of time. However, he seemed to be only following the formal instructions of the task. The second part of the activity (after the learning diaries were filled out) was almost complete off-task for all the students in the group. The teacher tried to re-engage students by regulating their behavioral engagement. She asked whose turn it was to draw, but there was no clear answer. Therefore, this regulation did not contribute to behavioral engagement significantly. Students stayed disengaged, and the activity was highly disorganized.

At the activity on Lesson 2 only two students were analyzed from Group 2 – Anna and Antti. They were supposed to work as a pair. The teacher gave detailed instructions on the task, but Antti was not attentive. When Anna tried to begin the activity, he did not support it. In a while the teacher approached and had to regulate Antti's behavior to some extent again. The teacher asked Antti: *“Now you concentrate on this task, is it clear?”*. However, that did not bring sufficient results, and the teacher asked whether Antti could do this activity or wanted an individual task: *“Antti, are you able to do this work? Now you can choose if you do this task with Anna or the printed task alone”*. Antti chose to do the

task with Anna, and started wondering what they were supposed to do in the task. At this point the teacher had to start assisting the pair step by step so that Antti attained to the task and continued fulfilling it (see Figure 4):

Teacher: *Anna just asked you, then now you choose the place that Anna asked. How do you travel to – then what did you say? Stockholm – click Stockholm.*

Antti: *Why does it matter, why can't I click something else?*

Anna: *Click...*

Teacher: *Because Anna asked about that one, that how do you travel to Stockholm.*

Antti: *But I don't travel there!*

Teacher: *But this is an imaginary situation.*

Anna: *Stockholm is my favorite place in Sweden.*

Teacher: *Now you can choose that with which one you want to travel with. How do you say it in English? By...*

Antti: *Plane.*

Teacher: *Plane. And then Anna asks how much it costs...*

Anna: *How much does it cost?*

Antti: *“Kaks, kaks...”*

Teacher: *In English, please.*

Anna: *English!*

Antti: *Two hundred forty eight...*

Teacher: *Yes, euros. Good! Antti, now you can choose what place you ask Anna about, (showing the smartboard) there is an example on the smartboard.*

Anna (helping Antti): *How...*

Antti: *How do you travel to Turku?*

Anna: *By, by...*

In this case Antti did show on-task behavior, but the quality of engagement was quite low since he relied very much on the teacher and her directions and did not show willingness to take control of the task himself. A similar phenomenon is described in the study by Rogat and Linnenbrink-Garcia (2011). They describe a group where students relied very much on the teacher who was regulating their work on the task and engaging in



frequent monitoring of the group and the quality of their work. When they called for the teacher to ask some questions, the teacher was also checking the current progress of the group and provided feedback about it. Thus, the teacher took more initiative and responsibility in regulating students' work than they did themselves. Rogat and Linnenbrink-Garcia (2011) make a conclusion that this group did not engage in higher quality monitoring itself. I think this phenomenon can be transferred to the situation described above.

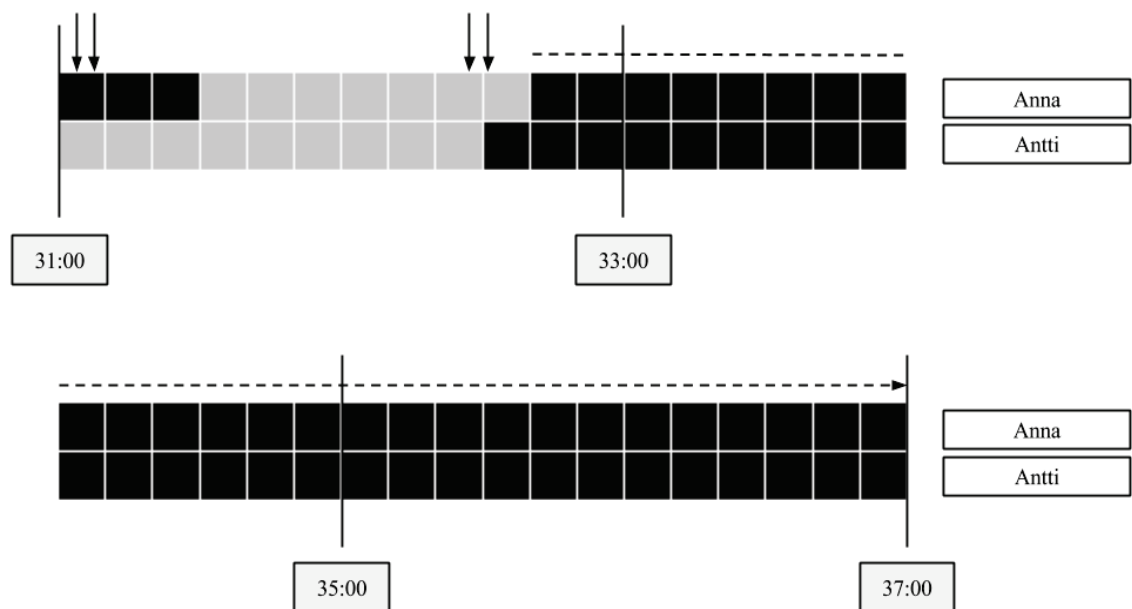


Figure 4. Individual on-task/off-task time, Group 2, Lesson 2.

Note: Grey – off-task, black – on-task, black arrow – regulation of behavior by the teacher, dotted arrow – assistance by the teacher.

The activity of Group 2 on Lesson 4 demonstrated similar phenomenon. After the teacher gave the instructions, Antti was first playing a game, and the teacher had to tell him strictly that he should start working on the task (i.e., regulation of behavior by the teacher). First Antti showed helplessness: he did not know how to start doing the task, and the teacher helped him go step by step, assisting him (e.g., by writing the title, choosing a color in the popplet, and so on). With the teacher's instructions Antti was soon ready to proceed with the task by himself for a while. Difficulties appeared again when students had to present their popplets to each other. Antti did not want to present. The teacher had to

regulate Antti's behavior again, and then she had to assist the group to make sure that they would continue fulfilling the task. The teacher asked the students in turn to present their products. After presenting, Antti started playing a game at once. Anna, however, demonstrated independence fulfilling the task throughout the whole video episode.

Finally, Group 3 turned out to be the one with least teacher interference in their work. In case of the activity on Lesson 1 the teacher did not interact very much with the group, with some minor exceptions. Teacher's involvement did not seem to be crucial for the activity and engagement in this group on Lesson 1. At the same time, however, it is possible to say that Group 3 was the only group where more or less successful group work could be observed during this task. This activity in Group 3 is described in more detail in the next section from the point of view of peer regulation.

On Lesson 2 the activity was supposed to be in pairs. However, Joni received an individual task from the teacher as he demonstrated disruptive behavior, and the teacher asked Petri to join the girls. The girls worked in a pair, but Petri did not join them at any point of the task. The teacher did not interfere to the group work too much. She reminded Petri twice during the activity that he was supposed to work with the girls, however, he ignored her directions and stayed disengaged throughout the activity.

On Lesson 4 it was only possible to analyze the activity of Laura and Elina. Their work on popplets was of a high quality engagement. The teacher did not have to regulate the girls' behavior or provide assistance, and the only teacher involvement was in the form of additional instructions that contributed to the girls' engagement and supported it. The girls showed independence and willingness to work on this task, and stayed focused throughout the activity.

#### 5.1.5 Peer support and regulation

A considerable part of re-engagement during the analyzed learning activities was happening due to peers regulating each others' behavior. In this study I paid attention to students' verbal statements that were meant to regulate the work of their peers. I discovered that the majority of such statements were related to structuring the activity, mainly by coordinating turn-taking and using support materials in a group/pair. I also discovered that in case when own efforts to structure the activity in the group were not sufficient, a student would draw the teacher's attention in order for her to help structure the activity.

Demonstrative situations are described in this section.

For example, on Lesson 1 the children in Group 1 did not know who should start drawing first, and Ville made an attempt to organize turn-taking in the group: *“Who is good to draw? You are good at drawing (pointing at Terhi), you will draw”*. Terhi wanted to start drawing, but Alekski took the iPad and started playing around with it. At this point Terhi was expecting him to start doing the task, and she said to him in order to draw his attention to the proper use of support materials and thus organize the activity: *“Hey, can everyone see it? Put it over here that everyone can see it”*. However, Alekski continued playing around with the iPad. At this point Ville said: *“Alekski is playing a fool...”* in order to draw the teacher's attention and reorganize the activity in the group. The teacher approached the group table, regulated the children's behavior, and gave the iPad to Terhi who started doing the task. Therefore, it can be said that peer regulation combined with the teacher interference worked as a tool for restoring and reorganizing the group's engagement in this case. As it could be seen from the results described in section 5.1.4, the teacher had to regulate Alekski's behavior quite a lot during the activity on Lesson 1.

Later on this lesson Terhi regulated her peers' actions by providing some instructions about using support materials to them. For example, she said to Alekski: *“No, no, you aren't supposed to look from the book!”*, and later (again to Alekski): *“Take a new (blank) page”*.

During the activity on Lesson 2, Terhi and Alekski worked in a pair. As it is seen from Table 3, their task engagement was of a high intensity and cohesion. In the beginning of the activity the children were deciding who starts to ask the first question, by that organizing turn-taking. Alekski said: *“I will start!.. No, you ask first”*. After this Terhi asked the first question, and the pair continued working successfully towards the end of the activity.

During the activity on Lesson 4 students in Group 1 demonstrated high levels of engagement in the activity (except for Jussi who was not engaged during the second half of the task). Therefore, there was not much need to regulate behavior in order to restore engagement or involve peers into the task. However, still some statements aimed at structuring the activity could be observed. For example, when Alekski was hesitating about something while doing the task, Terhi offered him to check it from her book (using support materials): *“You can look from that”*. When the teacher gave the instructions for presenting

popplets in the group, Terhi was still working on her popplet. At some point she said: *“This is the final with me”*, meaning that she was about to finish doing the task. By that she was indicating that she was soon going to be ready to present and the rest of the group had to wait for her for a while (turn-taking). When the presentations were taking place, Ville made sure that Terhi had presented her popplet already: *“Have you presented, Terhi?”* (turn-taking).

Therefore, peer regulation techniques worked quite well in Group 1. Although these techniques were mainly related to superficial aspects, such as formal structuring of task-related activities, they contributed to behavioral engagement and had a positive effect on group self-organization.

There were peer regulation techniques observed in the activity of Group 2 as well. The activity on Lesson 1 was highly disorganized, and as it was discussed in section 5.1.4, the teacher had to pay a lot of attention to the group by repeating instructions throughout the activity, giving hints and organizing turn-taking in the group. The children were also trying to organize and regulate the activity in the group themselves. For example, when Antti wanted to draw and it was Oskari who was drawing at the moment, Antti said to Oskari: *“You shouldn't have drawn more than one!”*, by that making sure that turns would be taken also by others. When it was Antti whose turn it was to draw, he looked confused about what he was supposed to do. Just like in Group 1 on Lesson 1, combined support from the teacher and peer helped organize the activity and helped Antti engage:

Teacher: *Ok, Antti, is it your turn?*

Antti: *What? What I took to a trip? For example sausage...*

Teacher: *Now it's your turn to draw. These traveling items.*

Anna: *And we are trying to guess.*

Antti started doing the task, but in a while his attention was lost, as he started discussing something with Anna. Then Anna said to him: *“So draw it to the end already!”*, which could be aimed at ensuring that other students in the group would also have time to draw. Anna's request made Antti re-engage in the task again and continue drawing.

The activity of Anna and Antti on Lesson 2 was described in detail in section 5.1.4 from the point of view of teacher interference. However, there is one important detail to be

pointed out still. It was Anna who drew the teacher's attention to their pair when she realized she could not involve Antti in the learning activity. Anna said (apparently to the teacher who was nearby): "*Antti doesn't begin to do*" in order to attract the teacher to help her in involving Antti in the task. After this the teacher approached and started assisting the pair in fulfilling the task. Therefore, these cases illustrate that peer regulation was not enough and it was necessary to attract the teacher as well.

On Lesson 4 Antti showed unwillingness to do the task again, especially when it was about presenting the popplets in the group. As it was discussed in section 5.1.4, the teacher had to assist the group, making sure that they were taking turns and everyone had the opportunity to present. When the teacher approached the table and asked if everyone had presented own work, Antti demonstrated attempts to reorganize turn-taking in the group in the way that he would prefer:

Antti (to Anna): *Why didn't you ask him* (meaning Oskari)?

Teacher: *Everyone presents in turn.*

Antti: *Anna asks that* (meaning Oskari), *and Oskari asks me, I won't reply to that* (meaning Anna).

At this point the teacher had to regulate Antti's behavior, after which she asked each student in turn to present their works in the group. Antti's behavior, demonstrated above, seem to have had a negative effect on the work of the group from the emotional point of view, and the regulation from the teacher could only restore behavioral engagement but not the socioemotional aspect.

Finally, some interesting phenomena were also observed in the activity of Group 3. As it was already mentioned in section 5.1.4, the activity of this group on Lesson 1 was the most coherent, with little amount of shifts from on-task to off-task behavior. It was also discussed that the involvement of the teacher was minimal in case of this group in this activity. The children regulated each others' behavior and organized the activity in the group, for example, by providing necessary limitations related to the use of support materials:

Petri: *Close your books! Elina, close your book!*

Elina: *You can't look from the book! You can't look because Katri said.*

The girls in the group were also concerned that everyone could have a chance to draw, and that turns were distributed fairly. First Elina asked in the group: “*Will we do like that everyone can draw?*”, but her suggestion did not receive a reply. The boys were giving the iPad to each other, and Elina did not get a chance to draw. Laura then started repeating many times that the boys should let Elina draw:

Laura: *What if Elina draws?*

Laura: *Seriously, next we should give it to Elina.*

Laura: *You should let Elina draw. Next – to Elina...*

However, the boys did not listen to Laura and the iPad still remained with them. What is interesting to notice here is that Elina did not disengage because of that – she still stayed concentrated and kept trying to guess the items that were being drawn, even though the boys were not responsive. This situation could have caused negative emotions in Elina, but she managed to cope and continue staying on-task. Petri and Joni were very lively during the activity. Petri sometimes got distracted, but that lasted only for a few seconds, and then he got involved in the task again. Joni was moving around a lot, but engaged in the task in general as he was constantly following what was happening (see Figure 5).

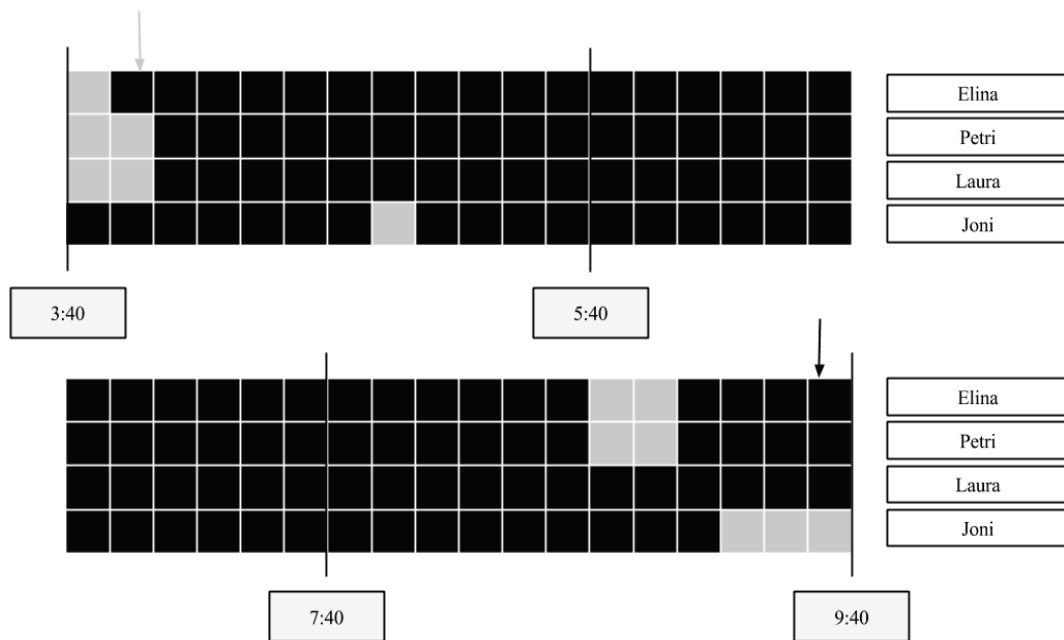


Figure 5. Individual on-task/off-task time, Group 3, Lesson 1, Part 1.

Note: Grey – off-task, black – on-task, grey arrow – additional instruction from the teacher, black arrow – regulation of behavior by the teacher.

After the learning diaries were filled out, Laura was again concerned with turn-taking, insisting that the boys should let Elina draw:

Laura: *Really, please, everyone should have a chance to draw!*

Laura: *Give the iPad to Elina now, seriously, she should have a chance to draw.*

At this point the boys finally gave the iPad to Elina, who started to draw at once, and the rest of the group were trying to guess. The group stayed engaged until the new instructions were given by the teacher (see Figure 6). Activity in this group on Lesson 1 was the only activity where more or less successful group work could be observed from the point of view that everyone took part in the task, took turns, drew and guessed, as well as followed each other's drawing. The work was not completely successful due to the disagreement about turn-taking. However, as it was demonstrated, that did not result in disengagement of individual students.

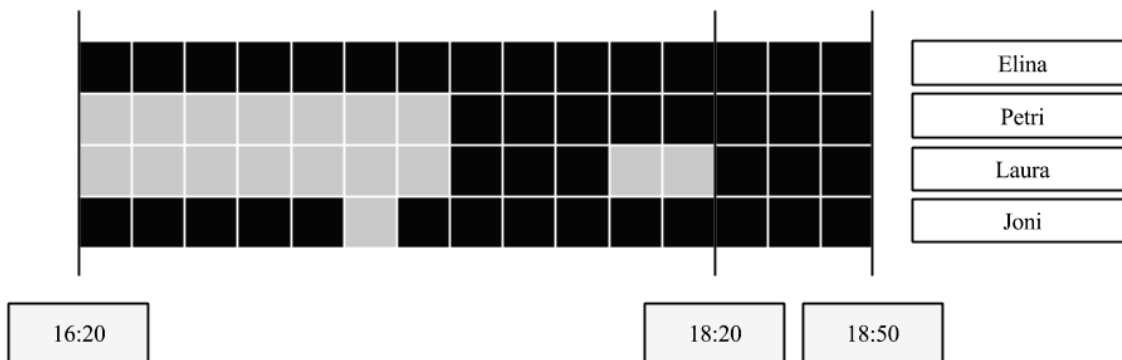


Figure 6. Individual on-task/off-task time, Group 3, Lesson 1, Part 2.

Note: Grey – off-task, black – on-task.

There is something interesting to be commented about the activity of Group 3 on Lesson 4. While all previously discussed regulation statements related structuring activity in a group in terms of turn-taking and using support materials, during this activity there was some other kind of regulation observed. Elina and Laura were working on their poppets, while boys did not seem to be so much engaged in the task. So, Elina started talking to Petri and asking him:

Elina: *You never learn anything. Should we help you?*

Elina: *You won't learn if we don't help you. You really won't learn if we don't help you.*

Elina: *How can I help you learn?*

These statements were not related to formal execution of the task, such as turn-taking or using available tools for the task. At this point Elina started monitoring and evaluating Petri's academic competence. However, Petri was not reacting accordingly to these statements, as he started to joke and talk about a different topic with Elina.



## 5.2 Engagement as a dynamic concept

To sum it up, it can be said that qualitative analysis of classroom context factors and their influence on individual students' engagement, presented in sections 5.1.1-5.1.5 can provide us with a picture about dynamics of engagement in an authentic learning context. Visual representation of changes in an individual student's engagement in the form of a time line with on-task/off-task episodes marked on it made it possible to attach these changes to specific events happening in the context (e.g., teacher interference or peer support). The described examples demonstrate that it is normal for student engagement to be constantly changing under the influence of multiple classroom environment factors, such as task characteristics and social interactions. Such changes can be both positive and negative.

As Järvelä and Renninger (2014, in press) suggest, design should acknowledge differences among individual students in their current levels of interest, motivation, and engagement. Some learners need more support as they do not yet recognize the affordances of their learning environment, which their peers already treat as learning opportunities (Järvelä and Renninger, 2014, in press).

There is no single “correct” way to foster motivation and learning in different classrooms (Pintrich, 2003). It is important to keep in mind that behavior, activity, experience, and therefore, learning can not be designed. What is possible to design is *things* that influence behavior, activity, experience and learning (Goodyear & Dimitriadis, 2013). Design, therefore, should be understood as something having an indirect impact on learning itself, as well as it should allow for adaptation and further redesign (Dimitriadis & Goodyear, 2013). Thus, the main task for classroom teachers is to be sensitive and keep searching for the most effective combinations of supports in order to help individual students initiate and maintain engagement in classroom activities on a high level.

## **6 CONCLUSIONS AND DISCUSSION**

### **6.1 Findings of the empirical study in the frame of previous research**

The results of the empirical study make it possible to draw a row of conclusions. The findings show that all the set reserch questions were answered. A significant part of the results confirms previous research findings and fits into existing understanding of engagement.

To begin with, the results suggest that the majority of students who took part in the study found use of iPads in the tasks as an entertaining factor, thus increasing the attractiveness of the tasks, which goes in line with previous research findings (see Ang & Wang, 2006). The fun part of the task should not be underestimated, according to Newmann et al. (1992). Using technology in classroom tasks proved to be an opportunity to increase students' immediate situational interest in tasks, cause positive emotions, and serve as a catalyst for initiating student task engagement.

At the same time it is important to design technology-supported tasks in such a way that students stay engaged throughout the whole task and do not lose focus, as well as it is important to keep in mind that using technology can be distracting (see Bulger et al., 2008). In case of this study it was possible to observe that some of the students could start playing a game instead of doing a task. In this case it is possible to assume that it was difficult for individual students to find utility in the task and establish meaningful connections to it. Some other students fulfilled a task quickly and then started playing a game. It can be assumed that tasks should have been more challenging to keep these students' attention for a longer period of time. According to previous research on the topic, tasks should be challenging (see Stipek, 2002; Lam et al., 2012; Newmann, 1992; Perry & VandeKamp, 2000), but at the same time achievable (Porto, 2007) and allowing for success for all students (Newmann et al., 1992).

By providing access to various tools, applications, and authentic information (Bulger et al., 2008), and thus offering more opportunities for choice within tasks, technology is also capable of supporting students' autonomy. The answers obtained from the learning diaries suggest that it was difficult for students to evaluate how much autonomy and opportunity to choose different ways to work was given to them with the

iPads. Their answers did not always correspond to the results of their engagement from the on-task/off-task analysis. This can be explained by the fact that students were to evaluate the level of choice provided to them only in one specific and relatively short activity each lesson, which was challenging. In addition, students' autonomy with these tasks was not explicitly emphasized by the teacher, and in many cases students seemed lacking confidence about having the right to make choices as they still asked specific questions from the teacher and relied on her approval and instructions. Nevertheless, in this study it was possible to observe that most students were more engaged in the task when they could make own choices, and they enjoyed this opportunity. This observation goes in line with previous research findings about positive effect of autonomy support on student engagement (see Connell, 1990; Perry & VandeKamp, 2000; Lam et al., 2012; Guthrie & Cox, 2001). The task on Lesson 4, being most open, caused greater interest and willingness to make own choices and express themselves in the majority of students.

The results of the study support the idea that the more meaningful task is for an individual student, the more engaged this student is in the task (see Newmann et al., 1992; Järvelä & Renninger, 2014, in press; Porto, 2007; Lam et al., 2012). This could be observed from the analysis of the task on Lesson 4 as well. This task was built on students' own experiences, thus letting them connect the task to their individual vision of the world around them. In addition, access to Internet provided an opportunity for students to find relevant and meaningful content (e.g., pictures). Combination of autonomy support and task meaningfulness seemed to promote students' engagement and creativity, letting them express individual perceptions in a unique way. Therefore, in general engagement during the activity on Lesson 4 turned out to be the highest, as well as most coherent.

The data made it possible to observe three different types of teacher interference in group/pair work that were meant to influence children's engagement. Different types of teacher interference had different effects. The most successful type turned out to be provision of additional instructions. Usually this type of support happened when a student was already engaged in the activity and only needed some details to be figured out. Therefore, such teacher support did not interrupt students' engagement or did not force it. On the contrary, it maintained engagement and promoted it further as the task progress was moving forward. As Pianta et al. (2012) mention, it is important that a teacher is responsive to needs of individual students. Less effective type of teacher-student interaction happened

when the teacher had to regulate behavioral aspects in the group. When the children were noisy or did not attain to the task, or when the teacher noticed that not all the students were engaged in the group, the teacher had to be strict and make students re-engage in the activity. In some cases, if the teacher was not strict enough, these attempts to regulate students' behavior were not successful and were even ignored. In other cases students followed teacher's directions and restored their engagement. However, it could be observed that in these cases engagement, as a rule, was quite superficial and was aimed at formal execution of the task requirements. Finally, the third type of teacher interference was intensive assistance. It was possible to observe it mainly in case of one individual student. The teacher had to stay with the student and do task-related actions step by step together with him. The student was indicating helplessness and was not initiating task activity himself, without the help of the teacher. This type of teacher interference was found to be least effective for student engagement. Intensive assisting resulted in a student's high dependence on the teacher's help (see Rogat & Linnenbrink-Garcia, 2011). Even superficial behavioral engagement was likely to disappear if the teacher would stop the assistance. According to Fredricks et al. (2004), it is important that a teacher pays attention to both social and academic aspects in interactions with students. The teacher, therefore, could have acknowledged individual students' feelings and emotions about learning assignments, and could have helped find utility in the learning content if an individual student's interest in the task was low (Järvelä & Renninger, 2014, in press).

Although the teacher's interference turned out to be a key element in shaping student engagement, students' ability to regulate each other was also an important aspect observed in this study. For the most part students used regulation aimed at structuring activity in a group/pair by ensuring proper use of support materials and fair turn-taking. Attempts to regulate had different level of success and, therefore, different impact on engagement. In cases where attempts to regulate peers' were not successful, students would draw the teacher's attention in order to for her to help. Thus, in case of Group 1, peer regulation happened quite naturally, although coordination from the teacher turned out to be necessary as well during the activity on Lesson 1. Overall, peer regulation in Group 1 was successful in terms of behavioral engagement. In case of Group 2, group work turned out to be challenging, possibly due to incompatibility of personal characteristics (Dillenbourg et al., 2009), different modes of interaction (Järvelä et al., 2011), or lack of

enthusiasm to engage in the task (Crook, 2000). Although some attempts of peer regulation had success, for the most part regulation by own means was not enough, and had to be combined with teacher support in the form of assistance. In case of this group it was possible to observe emergence of negative emotions, which could have undermined sociobehavioral engagement in the group (see Perkun & Linnenbrink-Garcia, 2012) and provoked off-task behavior (see Rogat & Linnenbrink-Garcia, 2011). Group 3 had least teacher interference and had to organize their activity themselves. Interestingly, even during a problematic situation and long-lasting attempt to structure turn-taking during the activity on Lesson 1 which could possibly cause negative emotions in one of the students, her engagement did not decrease. Peer regulation turned out to be quite sufficient in this group, and their group activity on Lesson 1 turned out to be of a better quality if compared to the other two groups. During the activity on Lesson 4, a different regulation strategy (aimed not at formal organization of the activity, but at helping a peer improve academic achievement) could be observed, however, it did not receive successful development. Therefore, the students had different skills organizing work in groups/pairs and regulating their peers' learning behavior.

Some students in this class tended to demonstrate quite stable and usually self-initiated engagement throughout all the analyzed activities. However, at the same time, other students' engagement was less stable and more dependent on external regulation by the teacher. I would like to speculate about possible reasons of such differences. As it was discussed in the theoretical section of this work, student engagement is shaped and affected by a great variety of personal, social and contextual factors. The factors discussed in the empirical part of this study embrace only on a small part of a large combination of aspects that influence student academic engagement. There is a large amount of aspects that are not in the focus of this study, and the effect of those factors on engagement of individual students may be crucial. For example, such personal factors as students' goal orientation and self-efficacy beliefs are not discussed in the empirical part of this study, as well as students' motivational and emotional characteristics related to the English language classroom and schooling in general. All of them might have had a decisive effect on academic engagement. Moreover, this study considers only educational context factors, and does not take into account larger factors, such as students' cultural background and family. These large factors that go beyond educational contexts are likely to have an

extremely strong impact on a student's attitudes and beliefs about school, and in case of their negative impact there is much more required from the educational setting in order to engage the student in learning. Finally, the reason of disengagement could simply be the fact that the students were not used to such arrangement of the English language classroom: there were new activities, tables were organized differently, and the students were placed in groups. In addition, there were five researchers present in the classroom and four cameras recording their activity, which could have caused negative emotions in students. Therefore, multidimensional nature of student engagement calls for taking into account multiple factors in order to understand it deeply. Many of the factors are left beyond the scope of this study.

Nevertheless, the results of this empirical study, even though its scope is not big, demonstrate that academic engagement in classroom is likely to be changing both in quantity and quality due to contextual factors – and this concerns all students, no matter how motivated and serious, or, on the other hand, unmotivated and careless they are. Thus, the empirical study demonstrates that engagement is not only a multidimensional, but also dynamic phenomenon. The study brings light on how student engagement may be shaped in a real classroom setting, thus reaching its main aim and giving us a chance to look into dynamics of student engagement.

Approaching engagement as a multidimensional concept can provide us with understanding of **what** makes it work, while viewing engagement as a dynamic concept can help us understand **how** it works. Knowledge of both aspects is needed in order to design teaching environments and practices that would enhance learning greatly. In the following sections I seek to make a contribution to both theoretical and practical understanding of engagement based on the results of empirical study, and suggest implications for further research which would bring more light on these issues.

### 6.1.1 Theoretical implications

As it was demonstrated in section 6.1, a significant part of the results of this empirical study goes in line with previous research findings discussed in the theoretical part of this thesis. However, as Dubois and Gadde (2002) note, the abductive approach often results from the researcher's aim not just to confirm existing theories, but to discover new things, generate new meanings and contribute to the development of existing theoretical models

by complementing them. At the same time it is important to mention that this approach “builds more on refinement of existing theories than on inventing new ones” (Dubois & Gadde, 2002, p. 559). This empirical study approaches certain aspects from a new perspective and brings in some new meanings into existing frameworks, thus contributing to understanding of engagement on the theoretical level.

First of all, findings of this study suggest that technology can serve as a tool for initiating student engagement by causing positive emotions and situational interest in the task. Although technology enhancing student engagement due to the entertainment factor was discussed in the reviewed literature (see Ang & Wang, 2006), the issue of technology being a catalyst for student engagement was not explicitly addressed there.

Second, reviewed previous research underlines the importance of the teacher's provision of autonomy support (see Connell, 1990; Perry & VandeKamp, 2000). In addition to that, findings of this empirical study also suggest that autonomy in students should be promoted by the teacher *explicitly*, otherwise students might not fully perceive the autonomy and tools aimed at supporting it provided to them in the classroom. In this case, even when autonomy is supported by the task and technological tools are available for use, students might lack confidence about making own choices and still rely on the teacher's approval highly.

Third, three distinct types of interactions with the teacher that had an impact on student engagement (i.e., regulation of behavior, additional instructions, and intensive assistance) are formulated and described in the study based on the observations. Their different effects on student engagement are discussed touching upon also such issues as the quality and types of engagement. Although the findings related to teacher interference partly found support in reviewed previous research (see Pianta et al., 2012; Rogat & Linnenbrink-Garcia, 2011), the three formulated categories raised from the data independently, and thus can be used to complement existing frameworks with new meanings.

Finally, in the same manner, three distinct types of peer regulation strategies (coordinating turn-taking, coordinating use of support materials, and involving teacher for help if own coordination attempts failed) are pointed out in the study, and their success is evaluated from case to case. The previous studies reviewed in the theoretical part of this thesis include classifications of motivation regulation strategies (Järvelä, Järvenoja, &

Veermans, 2008) and triggers of efficacious interaction in collaborative learning situations (Määttä et al., 2012), as well as the framework of high and low cognitive and behavioral social regulatory strategies (Rogat & Linnenbrink-Garcia, 2011). These studies, undoubtedly, helped maintain the focus and supported data analysis in this study greatly. In principle, the three strategies described in this study could fall into the category “task/environmental structuring” pointed out in the study by Järvelä, Järvenoja et al. (2008). However, the three strategies are presented in this study as separate and very concrete categories. They are applicable in different modes of work (e.g., group and pair activities; use of support materials strategy was also observed during the individual learning task). The three categories formulated in this study were identified independently based on the data for this study, and can complement existing knowledge about the strategies peers use in order to regulate each other's engagement.

#### 6.1.2 Practical implications

As it was already noted before, it is extremely important to be able to extract practical guidelines aimed at enhancing student engagement from the empirical research findings, since the key point of studying student engagement is improved learning. It is possible to summarize the results of this empirical study from the practical point of view by introducing a framework of guidelines for classroom teaching practices aimed at enhancing student engagement (see Figure 7). I would like to notice that a considerable part of these guidelines confirms previous research findings discussed in the theoretical part of the thesis:

- (1) Fun part of tasks should not be ignored, as it can initiate engagement by causing positive emotions and situational interest in students. Technology can be used to increase the attractiveness of tasks.
- (2) Tasks should be challenging enough in order to support initiated engagement.
- (3) Students' autonomy should be supported within tasks. Autonomy must be promoted by the teacher explicitly in instructions. Provision of autonomy can be supported by technology.
- (4) Tasks should be meaningful for students to be able to relate them to their personal perceptions of the real world. Task meaningfulness can be supported by technology.
- (5) A teacher should be always available and ready to help and provide additional



instruction in the classroom when a student has a question during fulfilling a task in order to support student engagement.

- (6) Behavioral regulation and intensive assistance could be combined with prompting students' thinking, providing more additional instructions, and helping students find meaning in the content of a task, thus calling also for cognitive engagement rather than only behavioral.
- (7) Taking into account students' personal characteristics and promotion of pair and group work on the lessons combined with teacher's relevant coordination could increase students' interaction skills in academic contexts, as well as regulation skills in a pair or group.

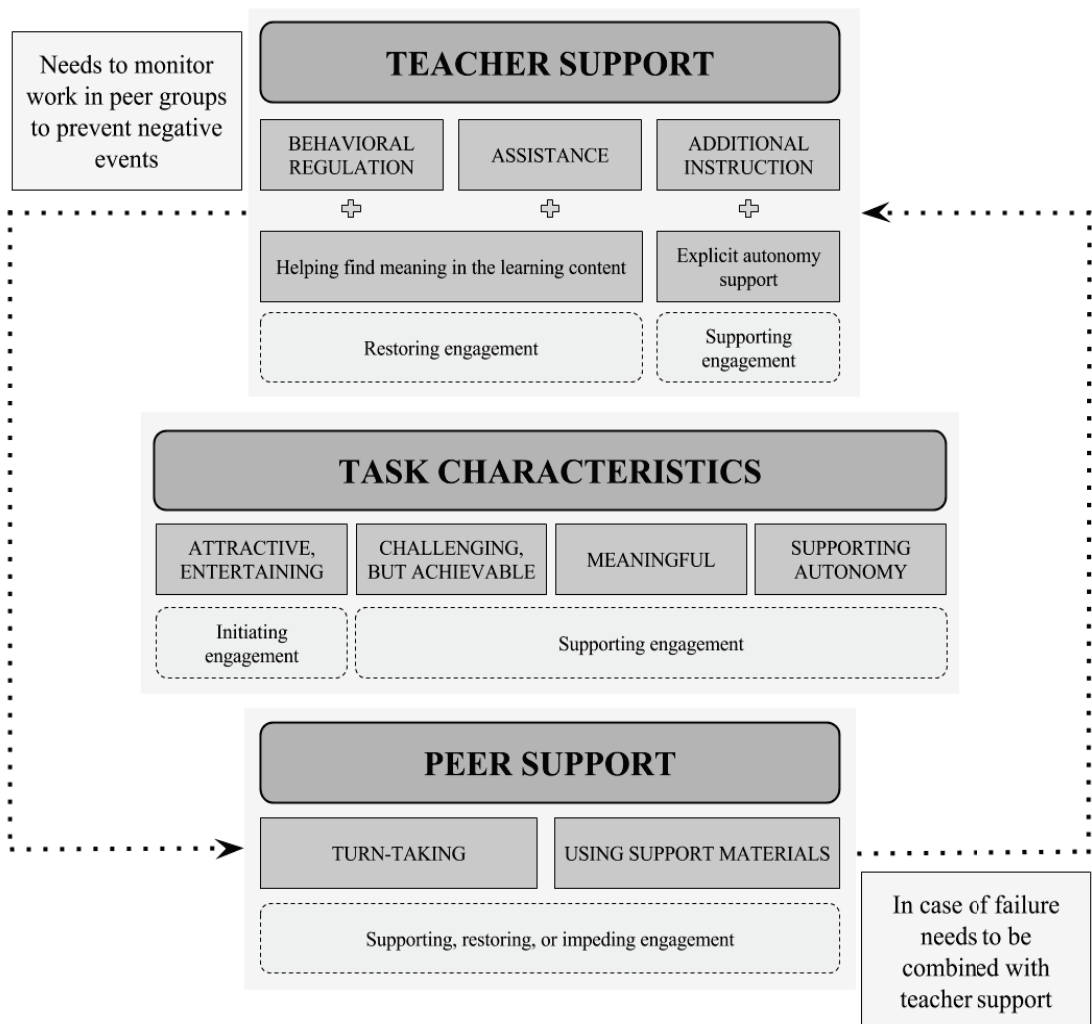


Figure 7. A framework of practical guidelines for classroom teaching practices aimed at increased engagement based on the results of the study.

It is important for the teacher to find the right combination of these supports for individual students. The results of the empirical study demonstrate that students had different needs in peer and teacher involvement in order to initiate and sustain engagement. In the same manner, for some students it was quite easy to perceive autonomy and task meaningfulness, while other students needed the teacher's help to realize those.

### 6.1.3 Implications for future research

This study is a valuable background for further investigating effects of task characteristics, teacher interference, and peer regulation on student engagement in classroom environment. However, future studies could address these aspects in more detail from the point of view of two aspects. First of all, in this study I did not aim at distinguishing and analyzing different types of engagement. Therefore, future studies could focus on how certain factors of academic environment influence emotional, cognitive, and behavioral engagement individually. In order to do this, clear indicators of each type of student engagement have to be identified and justified. Secondly, in this study the issue of different quality of engagement is mentioned by me only briefly. This study gives a hint about the quality of engagement being different: for example, it can be long-lasting, self-initiated, and deep, or short-term, dependent on other people, and quite superficial. Different quality of engagement is underlined as an important issue among researchers (see Connell & Wellborn, 1991; Fredricks et al., 2004) and can be addressed in future studies.

One more direction for future research could be dynamics of engagement on the group level (see Määttä et al., 2012). In this study I focused on the analysis of individual students' engagement, although some of the analyzed learning tasks were in a group or pair.

Role of technology in promoting engaging characteristics of learning tasks could be also investigated in deeper detail.

Finally, although on-task/off-task and phase-shift analysis method makes it possible to describe the quantity and coherence of engagement, as well as provides the opportunity to look into dynamics of engagement by establishing its sources, this method has disadvantages. For example, as Fredricks et al. (2004) claim, some of the characteristics of student engagement, especially cognitive, are not readily observable. The method does not always allow for recognizing different quality of engagement (Fredricks et al., 2004). Therefore, one of the implications for future research on student engagement could be

development of a more solid method, or a combination of methods, for measuring engagement. As Reschly and Christenson (2012) claim, current efforts to measure student engagement effectively are still in their earliest stages, and advances in measurement are needed in order to be able to clarify the theoretical issues in the concept of engagement.

On-task/off-task and phase-shift analysis method is one of the issues addressed in the final part of this thesis entitled “Evaluation” together with other relevant issues that allow me approach my study from the critical perspective.

## **6.2 Evaluation**

This study provides a deep discussion of engagement as a multidimensional concept by profound reviewing definitions and components of engagement together with related concepts, as well as factors affecting engagement.

The empirical part of the study demonstrates that engagement is not only multidimensional, but also dynamic concept. Data collection was carried out in an authentic context, thus making it possible to look into dynamics of student engagement in a real classroom setting.

As Fredricks et al. (2004) claim, indicating the source of engagement is one of the common problems in characterizing student engagement. In this study I attached measurement of engagement to specific sources, thus seeking to demonstrate how contextual factors affected engagement.

Finally, I approached the results of the study from the point of view of theoretical implications, thus contributing to understanding of the concept on the theoretical level, and practical implications, thus connecting theory to practice in order to move towards the main aim of studying student academic engagement – enhancing learning.

In the following section I discuss my study in terms of ethical issues, validity and reliability of the study, as well as its limitations.

### **6.2.1 Ethical issues**

Referencing techniques have been used carefully in this study, thus ensuring acknowledgment of the authorship of original ideas and avoidance of plagiarism. Various research literature has been used to view the concept of engagement from different perspectives and arrive at deeper understanding of its essence.

The data for the empirical study were collected in a teacher training school. When

children start their studies in this school, their parents are aware of and agree with the fact that their children will take part in research, and they provide their permission for that. Therefore, the parents' permission for carrying out the research study with participation of their children was obtained prior to the intervention. The research permit was also obtained from the University of Oulu to carry out the study in this teacher training school.

The researchers introduced themselves to the students participating in the study in the beginning of the intervention, as well as the teacher explained them that the researchers were going to observe during the classes and collect other data for the study. The teacher informed the students about the length of the intervention.

As Derry et al. (2012) note, video data are not anonymous in itself, but there are many ways to protect confidentiality, for example, by restricting access to the video and personal information about the participants, as well as not revealing names of the participants and particular schools where the data were collected. The collected data have been handled confidentially in this study. All the data collected during the study have been stored only by the participants of the research group. Video data have not been made public, and have been only used for the purposes of the research, as it was claimed before the intervention. The privacy of the data has been ensured. The names of the children and teacher have been changed in the present paper, therefore, individuals can not be recognized from the text, examples and citations. The issues of confidentiality have been discussed and agreed upon within the research team.

The data have been handled with fidelity. The research process have been described in the paper in detail from the methodological point of view. The choices made during the process of data collection and analysis have been justified from the ethical and methodological points of view. If some data were left out, according argumentation has been provided. The results have been reported in detail according to the findings, and conclusions have been made carefully.

### 6.2.2 Validity and reliability

The use of the terms “reliability” and “validity” is commonly accepted in quantitative research. Basically, “reliability concerns the extent to which an experiment, test, or any measuring procedure yields the same results on repeated trials” (Carmines & Zeller, 1979, p. 11). Therefore, the more consistent the results of repeated measurements are, the higher

reliability of the measuring procedure is. However, in order to provide an accurate characteristic of a concept, its indicator must be also valid. According to Carmines and Zeller (1979), “an indicator of some abstract concept is valid to the extent that it measures what it purports to measure” (p. 12). It is important to validate not the measuring instrument itself, but the instrument in relation to the purpose for which it is used. The terms “reliability” and “validity” play an important role in the qualitative research paradigm as well, however, in this case they need to be redefined.

In quantitative studies validity and reliability are treated separately, however, these concepts are not viewed separately in qualitative research studies. Terminology that includes both aspects is used, such as credibility, transferability, and trustworthiness (Golafshani, 2003). Qualitative research seeks to examine phenomena in context-specific settings and strives for understanding on the first place, therefore, credibility of a qualitative research is predefined a lot by the ability and effort of the researcher (Golafshani, 2003). Morse, Barrett, Mayan, Olson, and Spiers (2002) argue that verification strategies need to be used by the researcher during the whole study. Such strategies that should be built in the research study include, for example, investigator responsiveness, methodological coherence, sampling adequacy, and an active analytic stance. If a researcher keeps these principles in mind, they help adapt direction of the study and analysis, this way ensuring reliability and validity of the research project (Morse, Barrett, Mayan, Olson, & Spiers, 2002).

As Morse et al. (2002) note, collecting and analyzing data simultaneously helps form a vision of what is known and what needs to be found out. I was present at each lesson of the intervention in order to collect the data. During the lessons I was taking field notes about aspects relevant to my study. According to observations and field notes after each lesson it was possible to make necessary corrections in planning learning activities for the following lessons, as well as in data collection procedures.

Moreover, since qualitative research is iterative rather than linear, it has been necessary to move back and forth between the design of the empirical study and its implementation on the larger scale to ensure the coherence between research questions formulation, literature selection, data collection and analysis methods (see Morse et al., 2002). The original key direction of the study was aimed at investigating the effects of technology on student engagement. Having collected the data, I chose on-task/off-task

method as the most relevant one, and carried out the analysis. At the same time as the analysis was being carried out, the theoretical background was being developed on a deeper and more profound level. These two processes going simultaneously helped me realize that dynamics of student engagement need to be approached taking into account multiple factors from classroom environment, technological aspects being only one of them. Therefore, at this point I adopted the abductive approach and kept my mind open while working with the data. Using such an approach helped me locate relevant aspects that I could explore in this study with the data I had. At the same time, I had to give up on investigation of certain aspects due to the fact that the available data could not provide solid answers to the related questions. According to Morse et al. (2002), it is important for a researcher to be sensitive about the research process, and understand which ideas are unlikely to be strongly supported by the data regardless of personal excitement and initial potential of those ideas. Lack of responsiveness may result from working deductively from previously held assumptions (Morse et al., 2002). Thus, the research questions were being refined, and effects of technology on student engagement became only one of the aspects under investigation. Theoretical perspectives and findings from previous research studies helped me keep focus on certain aspects during data analysis, as well as take into account various characteristics of those aspects, thus making the data analysis deeper. Such verifying procedures helped me identify where research process needed to be modified in order for it to be credible (see Morse et al., 2002).

Methodological coherence needs to be established to ensure that research methods are chosen according to the research questions (Morse et al., 2002). I chose on-task/off-task and phase-shift analysis method as central in my study. The method provides a picture about quantity and coherence of individual students' engagement. Moreover, it is easy to match visual representation of the analysis in the form of a time line (see Figures 4-7) with current characteristics of the context (such as peer and teacher involvement), thus establishing the source of engagement and demonstrating dynamics of engagement in a real classroom setting. The methods and analysis procedures have been described in detail in the study, along with the principles for coding as on-task and off-task, which contributes to its credibility. On-task/off-task and phase-shift analysis was carried out using 10-seconds episodes. Such a short duration of analyzed episodes makes the results of the analysis more careful.

In qualitative research triangulation methods are used to ensure trustworthiness of research. According to Golafshani (2003), “engaging multiple methods, such as, observation, interviews and recordings will lead to more valid, reliable and diverse construction of realities” (p. 604). Triangulation across sources of data was ensured in order to support validity of the research. Although the main data source was video observations, learning diaries and students' products were used to demonstrate the characteristics of the phenomenon under study from different perspectives. Learning diaries were given to students in the middle of the activity in order to ensure that they better capture students' current perceptions of the relevant phenomena.

Although generalization of the results is limited, the results of the study can be transferred to a similar context.

### 6.2.3 Limitations

The main limitation of the study is a small sample size and, consequently, small data set. The study was carried out in a specific context during a limited period of time. These reasons make it necessary to carry out similar research studies, preferably during a longer time period, in order to make the generalization possible. In addition, this study focuses on a limited amount of classroom factors in order to explain student engagement. Many more factors need to be considered in order to truly understand dynamics of student engagement.

Second, the amount of researchers was quite high for such a small-scale study. Therefore, there were several data collection procedures simultaneously taking place in the classroom. This could have caused exhaustion in some children and later unwillingness to provide careful responses in the learning diaries. Moreover, due to the large amount of researchers having interest in collecting data through the learning diaries, it was not possible to narrow down the questions to specific learning situations or assignments.

Third, lack of the researchers' experience in conducting video observations resulted in poor quality videos in some cases, and videos where some of the students could not be seen properly in other cases. This fact limited the scale of on-task/off-task and phase-shift analysis as some students had to be left out from the analysis.

Finally, due to the small scale of the study and lack of time and human resources, it was not possible to attract the other coder for carrying out the on-task/off-task and phase-shift analysis of the video data, which would increase the credibility of the analysis.

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